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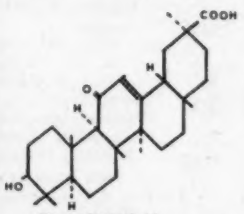

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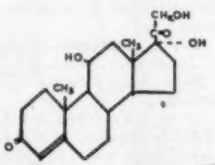

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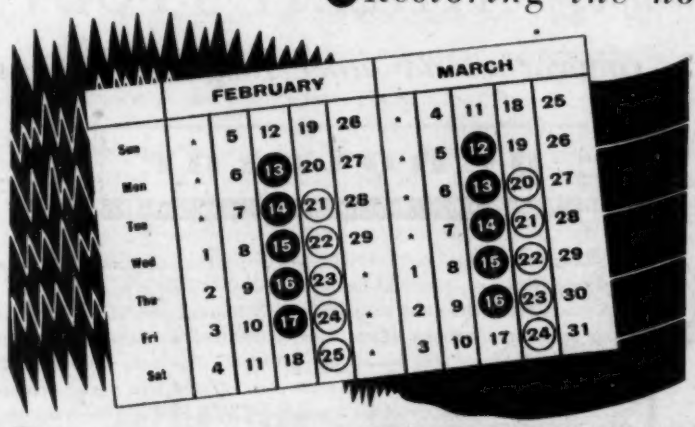

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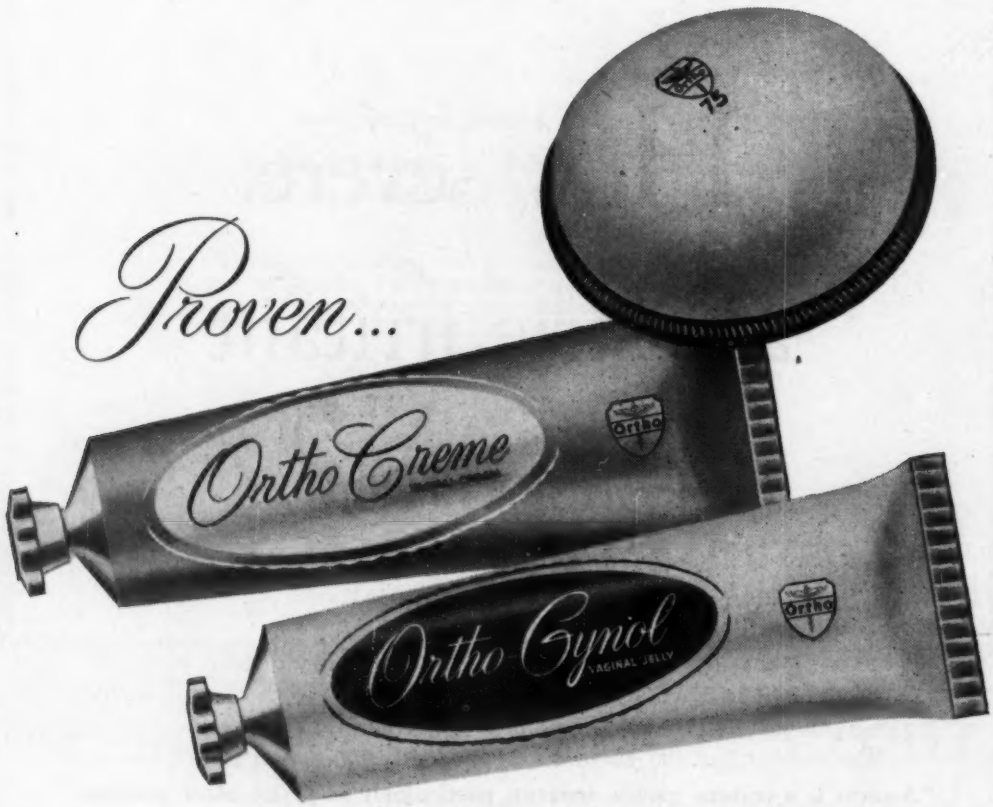

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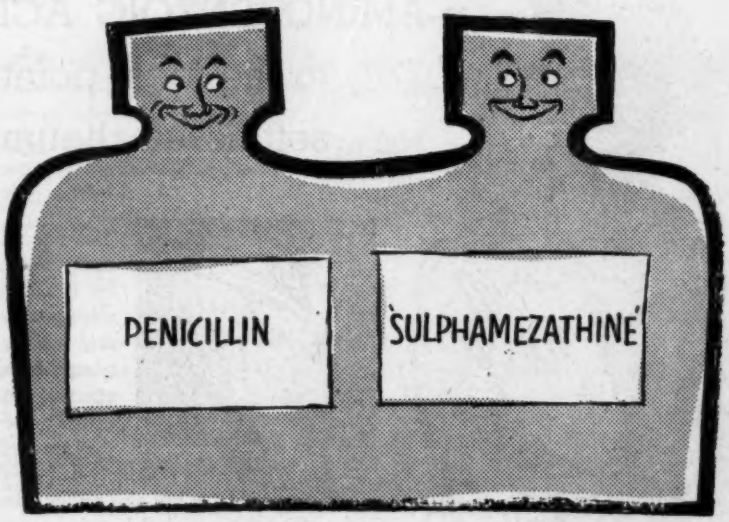

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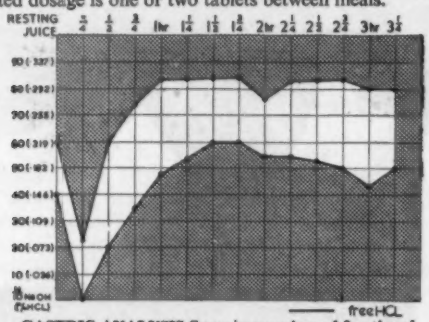

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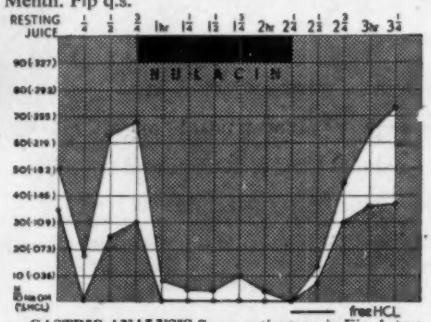

GASTRIC ANALYSIS Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued

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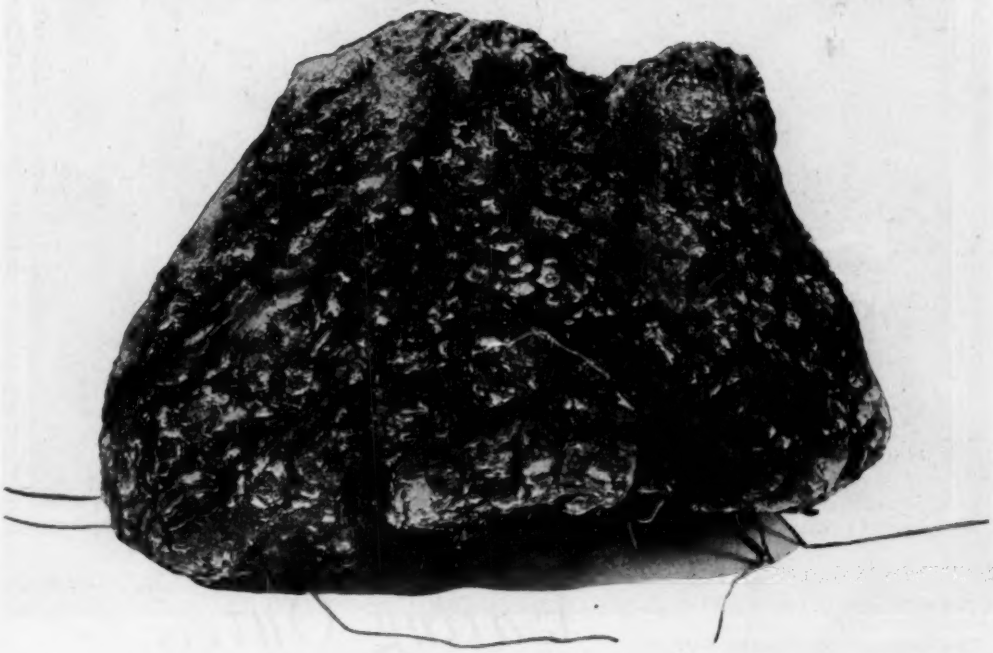

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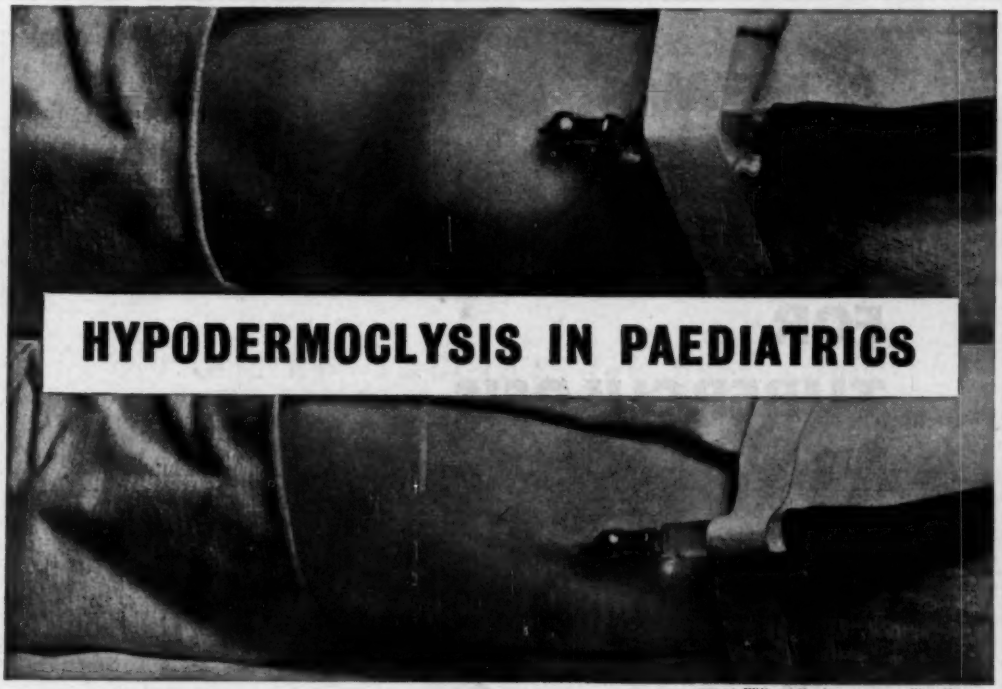

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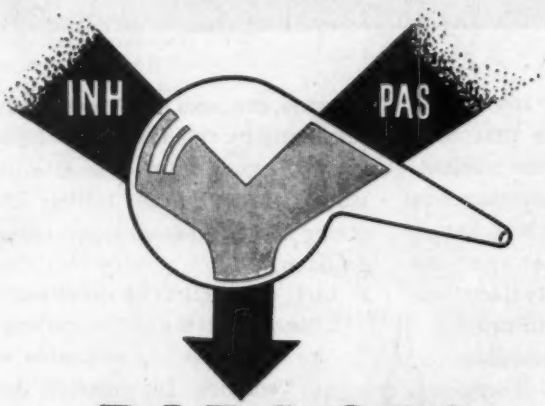

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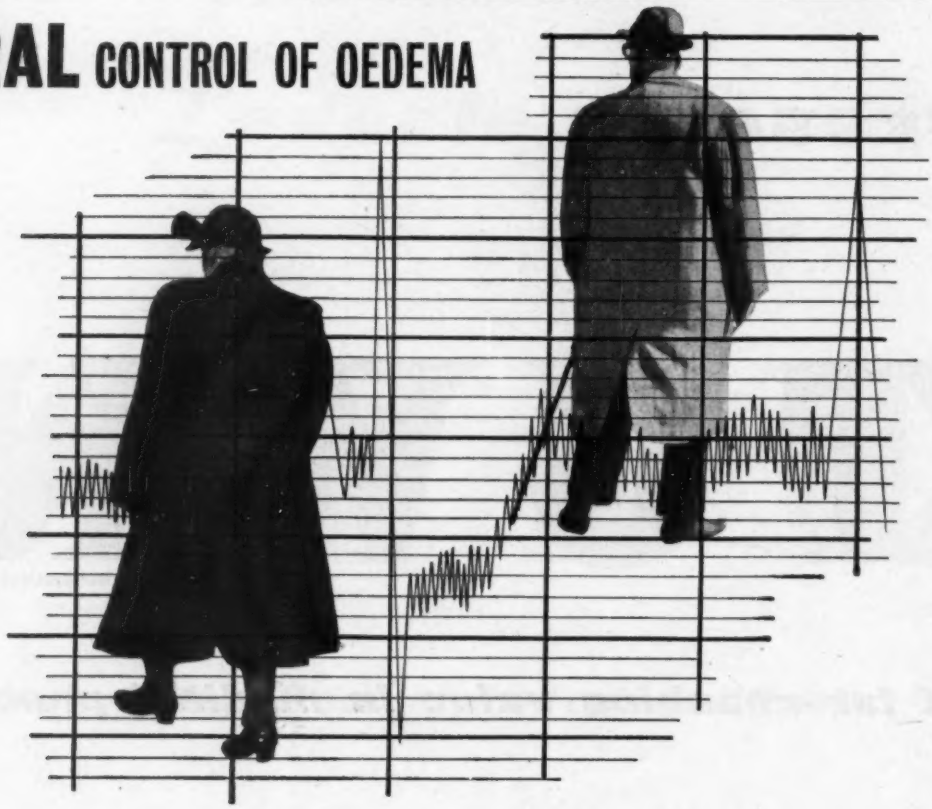

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REFERENCES: Lancet (1956) i., 537

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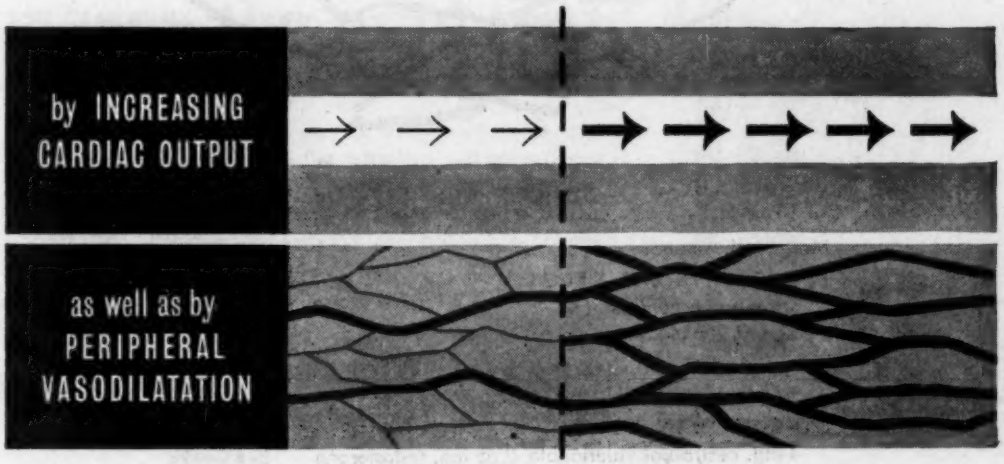

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Published work in this country and abroad (1) Lancet, 1956, **1**, 257, (2) Angiology, 1955, **6**, 190, (3) Angiology, 1955, **6**, 271, (4) Angiology, 1954, **5**, 314, indicates the value of Perdilatal in the treatment of intermittent claudication and associated vascular disorders. Perdilatal is a valuable addition to the overall therapy of peripheral vascular disease and its associated spasm.

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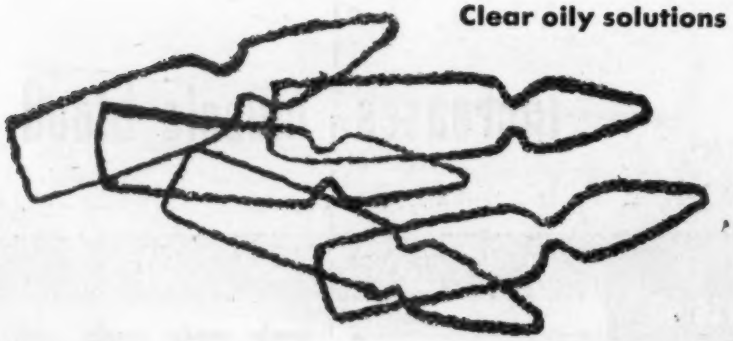

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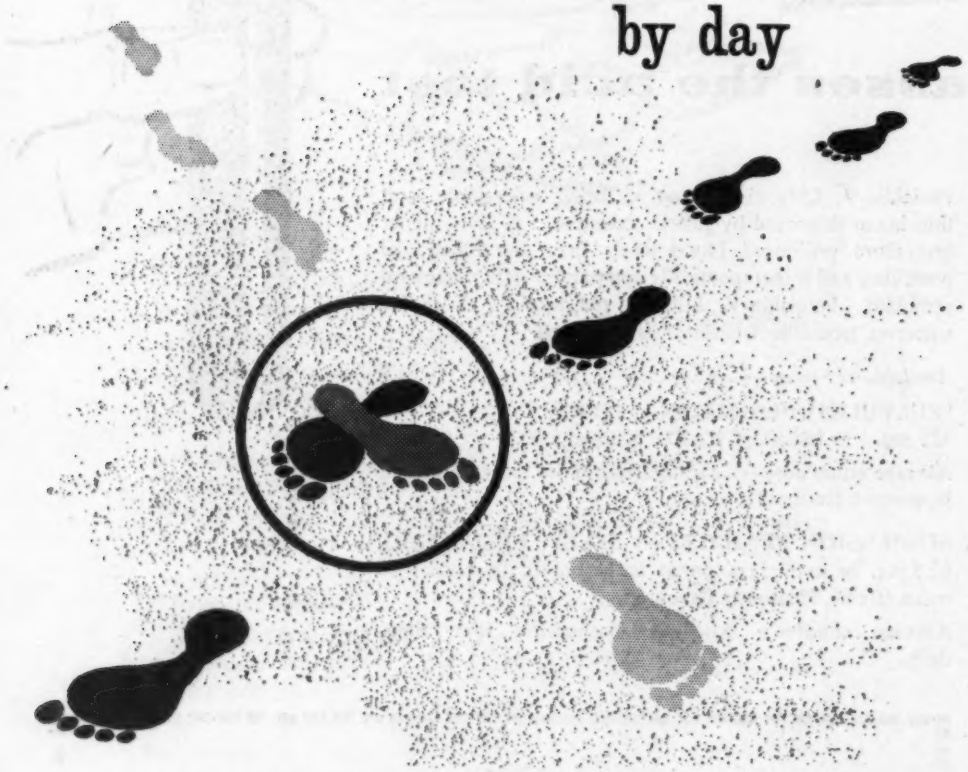

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See *British Medical Journal* (1955) 1 : 809

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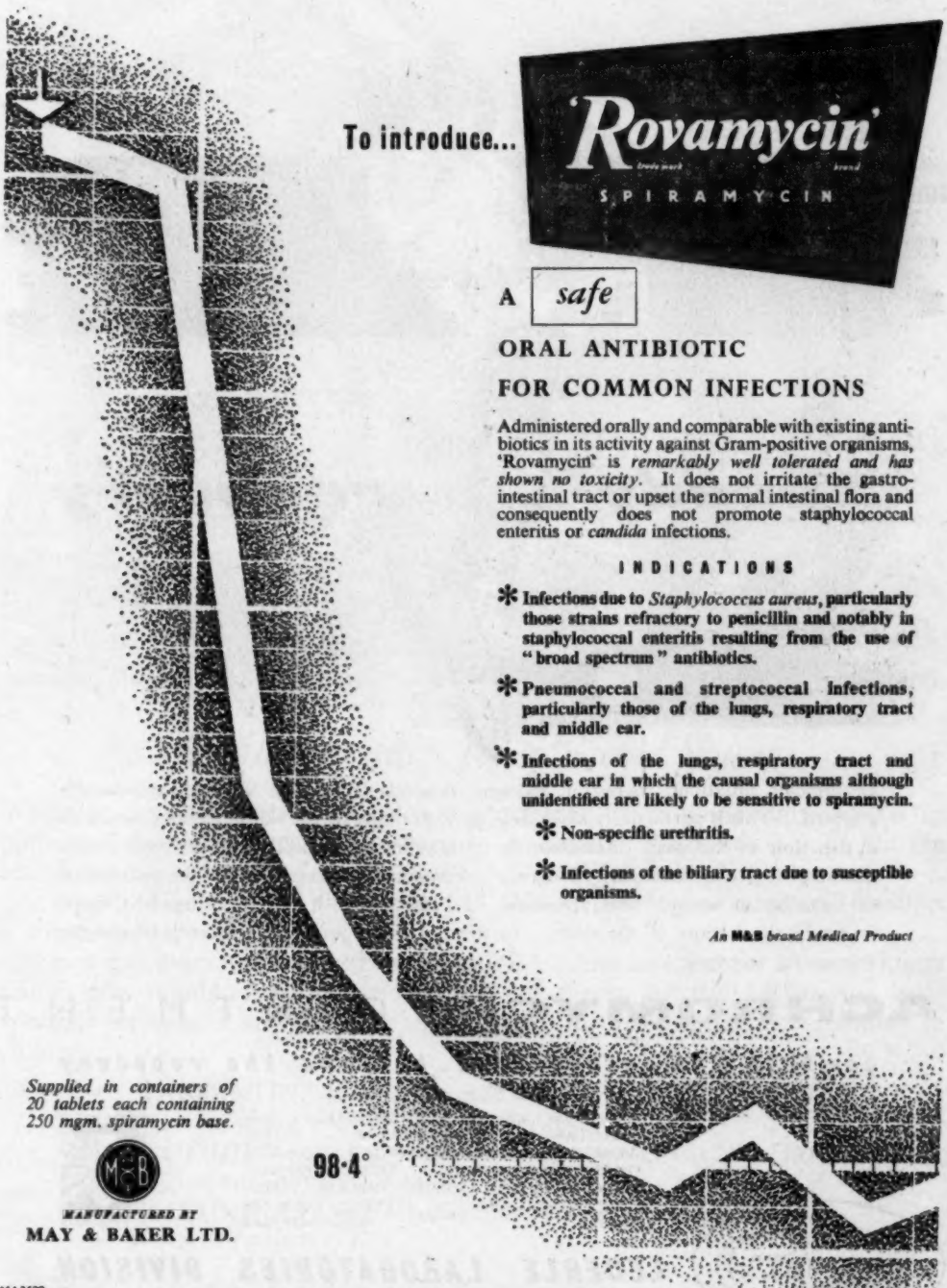

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Owing to its wide range of antibacterial activity, Chloromycetin "is the drug of choice in the treatment of laryngotracheobronchitis" . . . in which "the infecting organisms are either penicillin-insensitive or usually penicillin-resistant."

Med. Press 233:485, 1955

Septic Abortion May, 1955

In a review of 995 cases of septic abortion treated in a special puerperal sepsis unit, a number of cases were due to infection with coliform organisms or penicillin-resistant staphylococci. "Since 1951" state the authors "we have been impressed with the efficacy of Chloromycetin in this type of case."

Brit. med. J. 2:1239, 1955

Staphylococcal Empyema July, 1955

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Canad. M.A.J. 73:787, 1955

Acute Pyelonephritis in the Diabetic September, 1955

In a "condition which in most cases would otherwise be fatal", it is desirable to use an antimicrobial agent likely to be effective against the common urinary pathogens as well as organisms liable to produce secondary infection. "Chloromycetin offers the best chance of success and it is more likely to clear the infection with the first intensive course of treatment."

Canad. M.A.J. 73:956, 1955

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AMYOTONIA CONGENITA *

A FOLLOW-UP STUDY

JOHN N. WALTON
M.D. Durh., M.R.C.P.

FIRST ASSISTANT IN NEUROLOGY, KING'S COLLEGE, UNIVERSITY OF DURHAM, AT THE ROYAL VICTORIA INFIRMARY, NEWCASTLE UPON TYNE

MUSCULAR weakness and hypotonia in infancy and early childhood are important physical signs which continually provide formidable difficulties in understanding and interpretation. It is clear that they are associated with a variety of diseases, some of which are lethal and all of which make protracted demands upon the doctor in the care of the affected child and his family. For more than half a century our approach to these disorders has been dominated by terms and concepts which by continued use have come to be regarded as valid explanations rather than tentative labels. Before presenting the evidence of the present study it is necessary therefore to consider the observations which have been made in the past and the categories to which they have given rise.

Werdnig (1891, 1894) and Hoffmann (1893, 1897, 1900) each gave masterly descriptions of the infantile spinal muscular atrophy which now bears their names. This condition was described as one in which the child appears normal during the first few months of life but then develops a rapidly progressive flaccid paralysis of the limbs and trunk, progressing inexorably to death; it commonly afflicted more than one member of a sibship.

Oppenheim (1900) briefly described what he called myatonia congenita, later styled amyotonia congenita by Collier and Wilson (1908). It was suggested that in this condition the muscular weakness and hypotonia were present at birth; and, in contrast to the Werdnig-Hoffmann disease, the disorder tended to improve slowly but steadily, and was said not to be familial.

Many workers have since regarded Werdnig-Hoffmann's disease and Oppenheim's amyotonia congenita as separate entities. Others (Greenfield and Stern 1927, Grinker 1927) have claimed that the two clinical syndromes are the expression of an identical pathological process in the anterior-horn cells of the spinal cord, differing only in time of onset. Brandt (1950) has produced convincing evidence in support of this view: most cases diagnosed as amyotonia congenita showed the same progressive fatal course as did cases of later onset which corresponded to the accepted clinical descriptions of the Werdnig-Hoffmann disease.

The position is made more difficult, however, by the fact that many other conditions may give rise to generalised hypotonia of the skeletal musculature in infancy:

Batten (1909–10) and Turner (1940, 1949) have described a non-progressive form of myopathy which may in infancy give rise to the clinical picture of amyotonia congenita; the congenital universal muscular hypoplasia of Krabbe (1946) is similar.

Sobel's (1926) essential or primary hypotonia tends to improve spontaneously and thus corresponds to the classical description of amyotonia congenita, but its clinical picture and natural history have not been clearly defined. Many workers have suggested that this condition is the same as that called joint hypotonia by Finkelstein (1916) and hypermobility of the joints (due to congenital laxity of the ligaments) by Key (1927), Sutro (1947), and others; but in the latter disorder the abnormal joint mobility (as in contortionists) persists throughout life and there is no evidence of muscular weakness or of delay in motor development.

In addition to these conditions muscular hypotonia may be a symptom of numerous congenital abnormalities and metabolic or nutritional disorders, including congenital heart-disease, rickets, malnutrition, cretinism, chronic infection, and glycogen-storage disease, and of cerebral or skeletal abnormalities, including mental defect, atonic cerebral diplegia, cerebral birth-injury, arachnodactyly, and osteogenesis imperfecta. Brandt (1950) and Tizard (1954) have given comprehensive lists of the many diseases which may give rise to this symptom and have considered differential diagnosis in some detail. It was this profusion of causes of infantile muscular hypotonia which led Brandt to conclude that the syndrome of amyotonia congenita is a symptom of many disease states and not a separate disorder.

Clearly it is of the greatest importance to diagnose accurately the nature of the underlying disease in any infant presenting with generalised muscular hypotonia. The many conditions referred to above differ greatly in natural history and eventual outlook; some are grave, others benign; some are unresponsive to any form of treatment, others require specific therapy. In an attempt to provide information of value in diagnosis I report here the results of following up 109 cases previously diagnosed as amyotonia congenita.

Material and Methods

The inpatient records of the National Hospital for 1930–53 yielded 14 cases diagnosed as amyotonia congenita; to these were added 6 cases seen by me at the Royal Victoria Infirmary, Newcastle upon Tyne, in 1952 and 2 seen by me at the Massachusetts General Hospital, Boston, Mass., in 1953. Another 93 cases were obtained from the records of the Hospital for Sick Children, Great Ormond Street, for 1940–52. Of the 115 patients 109 were traced by letter; 56 of these had died, but information about their illness was obtained from either their parents or their general practitioners, either by letter or by personal interview. Of the 53 survivors 3 were inaccessible (2 were abroad) but gave information by letter, and the remaining 50 were interviewed and examined personally in 1955 either in hospital or at home.

Results

The original diagnosis of amyotonia congenita, made 2–25 years earlier, was revised in the light of the information obtained by correspondence or by personal examination. This revision was made possible as a result of the accumulated evidence concerning the natural history of the disease, the necropsy findings (in 5 cases), or through personal observation and examination of 50 of the surviving cases; in the 3 survivors who were inaccessible the recorded findings of other observers were adequate for a confident diagnosis to be made. Of the 56 fatal cases 55 were clearly of infantile spinal muscular atrophy; the other 1 was of a spinal-cord neoplasm, confirmed at necropsy. The revised diagnoses were as follows:

Diagnosis	*No. of cases*
Neuromuscular disorders:	
Infantile spinal muscular atrophy	67
Benign congenital hypotonia with complete recovery	8
" " with incomplete recovery	9
Congenital "myopathy" with myasthenic features	1
Progressive muscular dystrophy	3
Polymyositis (chronic myositis fibrosa)	1
Cerebral disorders:	
"Cerebral palsy"	6
Mental defect	8
Nutritional and metabolic disorder:	
Scurvy	2
Skeletal disorders:	
Arachnodactyly	1
Multiple congenital defects	1
Congenital dislocation of hip	1
Other disorder:	
Spinal ganglioneuroma	1
Total	109

* This work was done in the Neurological Research Unit, the National Hospital, Queen Square, London, during the tenure of the King's College (Newcastle) travelling fellowship in medicine and was aided by a grant from the Muscular Dystrophy Associations of America, Inc.

NEUROMUSCULAR DISORDERS

Infantile Spinal Muscular Atrophy

Of the 67 patients in this group 29 were male and 38 female. In seven families there was more than 1 case in a sibship, but no case in a previous generation had occurred within living memory; the genetic pattern was compatible with the accepted autosomal recessive mechanism of inheritance. In two sibships containing more than 1 case the disease began at birth or shortly afterwards in each patient.

In 33 (50%) of these cases the disease was present at birth or began in the neonatal period. In the remaining 34 cases it began at some time between the second month and the end of the first year of life, except for 1 case in which weakness appeared to begin early in the second year. The age of onset made little difference to the natural history of the illness, which was usually inexorably progressive; the downhill course was perhaps more rapid in the cases of early onset. Within the period of follow-up 55 of these patients had died, invariably of respiratory infection; the earliest age at death was 5 weeks, the latest 12 years, but most patients died between the third month and the end of the fourth year. The 12 surviving patients were aged 4, 5, 5, 7, 7, 9, 9, 9, 11, 11, 12, and 20 years on follow-up. All were severely disabled with severe muscular atrophy, contractures, and skeletal deformity, but in many of them the disease had been apparently stationary for several years.

Although the age of onset and the tempo of the disease varied considerably, the clinical picture was remarkably uniform. In infancy these patients had often been at first sight healthy, well nourished, and intelligent. It was only on closer examination that the severe symmetrical progressive paralysis of the trunk and limb muscles had become evident. They had tended to be virtually immobile, with the arms abducted at the shoulder and flexed at the elbow and lying on either side of the head, and the legs flexed and externally rotated at the hips, with the knees flexed. This position taken up by the limp and hypotonic baby is characteristic. Spontaneous movements had been few and small in range, and the baby could not lift his head or turn over. If lifted the baby would hang loosely or "slip through the hands." The striking hypotonia of the paralysed muscles could be demonstrated by the remarkable range of joint movement: the feet could be placed behind the head, or the fingers turned back to touch the forearm. The deep tendon-reflexes were usually absent or greatly depressed. Many patients had fasciculation of the tongue, and some, at an advanced stage, had paralysis of the pharyngeal muscles, with dysphagia and pooling of secretions in the pharynx. Intercostal weakness was often profound, and respiration became purely diaphragmatic, with the result that a striking recession of the lower ribs during inspiration (at the diaphragmatic attachment) was almost invariable. Those children who survived beyond the first year soon lost their "puppy-fat," and widespread muscular atrophy became clearly evident. Some muscles were thin and thread-like and, after several years, virtually gave place to rigid fibrous tissue; others retained a few contractile elements under voluntary control, and some of these fasciculated freely. Hypotonia persisted until the unequal atrophy and inevitable increase of fibrous tissue caused contractures, bringing in their wake severe deformities of the spinal column, pelvis, and limbs.

The affected muscles were tested electrically in 23 of these cases and usually revealed loss of the faradic response; intensity-duration curves in 5 cases revealed complete or incomplete denervation of the muscles tested. Of 10 cases subjected to electromyography 4 showed spontaneous fibrillation; the interference pattern of maximal voluntary effort was greatly reduced in all the cases, but the surviving motor units were either normal or above average in amplitude and duration.

Specimens of muscle were obtained by biopsy in 10 cases and at necropsy in 5 others. In all of these specimens the characteristic findings of denervation atrophy (grouped uniformly atrophic fibres) were noted. In all the necropsy cases the number of anterior horn cells was severely reduced.

Benign Congenital Hypotonia

This term is used as a descriptive title for the syndrome which was observed in a total of 17 cases; all patients in this group showed an initially similar clinical picture, but 8 of them recovered completely while 9 showed some improvement but remain moderately disabled. Hence the natural history of these cases somewhat resembles Oppenheim's original description of amyotonia congenita, but the new title of benign hypotonia is preferred in view of the unfortunate connotations acquired by "amyotonia" since it was originally introduced.

Cases with complete recovery.—All 8 patients in this group were limp, floppy babies and all have recovered completely. At the time of follow-up the 3 males were aged 7, 8, and 11 years, and the 5 females 11, 12, 16, 16, and 18 years.

In each case amyotonia congenita had been diagnosed in infancy or early childhood because of failure to sit up, walk, or pass other physical milestones at the normal age; on examination at the time of the original diagnosis these babies had all been limp and floppy. There had been usually striking hypotonia of the muscles of the limbs and trunk, with pronounced hypermobility of joints. Although the severity of the abnormality varied from case to case, the over-all clinical picture and the natural history of the disorder in these cases were again relatively uniform. In contrast to the cases of spinal muscular atrophy, these babies had not been paralysed but had made spontaneous movements of the limbs and trunk, even though these movements seemed comparatively ineffectual compared with those of a normal child. None of them experienced any significant impairment of respiratory movement. Each of these children began to walk between the ages of 20 months and 5 years and thereafter made slow but steady progress, though for several years they were clumsy, tended to fall frequently, and could not climb stairs easily or keep up with other children of the same age. Eventually, however, all of them were normally active and on examination showed no neuromuscular abnormality or hypermobility of joints.

Electrical stimulation of the muscles in 5 of these children gave normal results, but in 2 cases electromyography in infancy had shown excess of polyphasic potentials on volition. Specimens of muscle obtained by biopsy in 2 of these cases and stained with hæmalum and eosin showed no abnormality.

The condition which afflicted these children corresponds closely to the recorded descriptions of essential hypotonia (Sobel 1926, Lidge 1954); the fact that they recovered excludes that form of joint hypermobility (Finkelstein 1916, Key 1927, Sutro 1947) which is unaccompanied by delay in development or muscular weakness, is often familial (as is evident in certain families of contortionists), and persists throughout life. The present cases are reported in detail elsewhere (Walton 1956a). My observations have led me to believe that laxity of joint ligaments was not an important factor in these cases; rather, their condition appears to have been due to a widespread congenital muscular hypotonia of undetermined ætiology which eventually recovered completely.

Cases with incomplete recovery.—Of the 9 surviving patients in this group 4 were male and 5 female, and at the time of follow-up they were aged 6, 6, 7, 11, 11, 15, 17, 30, and 53 years. Amyotonia congenita had been

diagnosed at the age of 10 years in the patient aged 30 at follow-up, and at the age of 28 in the female patient aged 53 at follow-up.

Each of these patients had been a limp hypotonic baby, with an initial history strikingly similar to that of the cases, reviewed above, which recovered. Although they showed this picture of the "rag-doll" baby, spontaneous movements of the limbs were fairly good, and the striking flaccid weakness of infants with spinal muscular atrophy was not observed. Furthermore, the deep tendon-reflexes were generally present, though depressed. All of these children were late in reaching their physical milestones and did not walk until aged from 18 months to 5 years. Even then they were clumsy and fell frequently, and all their muscles seemed small and weak. They all showed some improvement after first beginning to walk, but this improvement was arrested, and although they were able to carry out most everyday activities they remain moderately disabled. The 2 oldest patients said that their muscles had always been "generally weak" but there had been no change in their condition for many years.

On examination at follow-up a uniform pattern of abnormality common to all the cases could be discerned. In all of them the skeletal muscles generally were abnormally small and slender and considerably weaker than normal; the upper facial muscles were involved in 3 cases, and the sternomastoids were usually particularly thin, more so than the posterior cervical muscles. In 2 cases the intercostal muscles seemed to be weak. The muscular abnormality was otherwise similar in the limbs in all the patients, except that in 2 of them the distal muscles were more powerful than the proximal. There was some evidence of persisting muscular hypotonia and of hypermobility of joints in all the cases, although this was slight in the 2 oldest patients. In 3 of the children, however, it was still striking at the ages of 6, 7, and 11 years. The tendon-reflexes were usually present, though sometimes depressed; in the patient aged 53 they were remarkably brisk. In 1 case there were slight contractures of the tendo Achillis, but serious deformities were uncommon; there was a moderate dorsal kyphoscoliosis in 3 patients.

Electrical testing of the muscles revealed no significant abnormality in 4 cases, but a pattern suggesting myopathy (numerous polyphasic and short-duration potentials on volition) in 3 cases. Despite this finding muscle biopsy in 4 cases (including 2 of those with the "myopathic" electromyograms) showed no abnormality.

The resemblance of these cases to the benign congenital myopathy of Turner (1940, 1949) is striking. They correspond even more closely to Krabbe's (1946) description of congenital universal muscular hypoplasia. As Ford (1952) has pointed out, the only difference between the descriptions of Krabbe and Turner was that in 1 of Turner's cases muscle biopsy gave findings compatible with a myopathic disorder, whereas in Krabbe's case the muscle was histologically normal. In Turner's case, however, there was a complicating disease (bacterial endocarditis) which could conceivably have been responsible, at least in part, for some of the pathological changes in the muscles. The resemblance of these cases to the 8 described above which recovered completely is even more close and the only difference seems to be one of severity.

These observations suggest that the syndrome of "benign congenital hypotonia" is due to a congenital abnormality or pathological process which gives rise to profound muscular hypotonia, without paralysis, at, or soon after, birth. In some cases the patient recovers completely with the passage of time, while in others recovery is incomplete and the patient survives with small, weak, hypotonic muscles throughout life. It seems probable that the syndrome which Turner called "benign congenital myopathy" and that entitled by Krabbe "congenital universal muscular hypoplasia" should be included in this group. I do not believe that these children are suffering from a true myopathy or muscular dystrophy. This argument is developed, and cases are reported in detail, elsewhere (Walton 1956a).

Congenital "Myopathy" with Myasthenic Features

This case was in a patient who corresponded in many respects to Turner's description of "benign congenital myopathy" but also showed pathological fatigability, a persistent improvement in strength on treatment with ephedrine, and a temporary response to neostigmine (Walton et al. 1956). In this patient, too, the histological changes found on muscle biopsy were minimal, and it is doubtful whether she could be considered to have a myopathy in the accepted sense of the term.

Adams et al. (1953) suggest that some cases of recovery from amyotonia congenita may have been examples of infantile polyneuritis. No such case was recognised in this series.

Progressive Muscular Dystrophy

These 3 patients (all male) had apparently been normal at birth, but during the first year their limb movements had seemed to become weaker and the muscles flabby. In 2 of the cases there had been severe muscular hypotonia and some hypermobility at the joints; this finding, combined with the flabbiness, had led to the diagnosis of amyotonia congenita. All 3 infants had begun to walk late (at about the age of 2 years) and had then been clumsy, had waddled, and had fallen frequently. Subsequently their walking had deteriorated, and on follow-up examination late in the first or early in the second decade they showed the characteristic features of the Duchenne type of muscular dystrophy, which begins in the first year of life in a significant proportion of cases; but hypotonia is an uncommon manifestation (Walton and Nattrass 1954).

Polymyositis

1 female patient had been noted to have weak limp muscles soon after birth, but without skin changes or pyrexia; she had not begun to walk until the age of 2 years and even then had been clumsy and had fallen frequently. She had become progressively weaker and developed contractures at the knees, elbows, and ankles; at the age of 8 years she became unable to walk because of increasing weakness and deformity of the limbs. Muscle biopsy revealed areas of degeneration and necrosis of muscle-fibres and inflammatory-cell infiltrates, with a striking increase in fibrous tissue—the picture of so-called chronic myositis fibrosa, which I believe to be simply a chronic form of polymyositis (Walton 1956b).

Bovet (1936) described a case of acute polymyositis in an infant with the clinical picture of amyotonia congenita, but this experience seems to be uncommon.

CEREBRAL DISORDERS

"Cerebral Palsy"

Of the 6 patients 3 were male and 3 female; 4 had been born after a difficult assisted labour and had been cyanosed at birth. Subsequently, all 6 had been slow to develop and to pass their physical milestones. Amyotonia congenita had been diagnosed because of paucity of spontaneous movements, or lack of purposive activity, combined with general hypotonia of the limbs; there had been some hypermobility at proximal joints in 3 cases. In all the cases, however, the deep tendon-reflexes had been present and often active at the time of diagnosis. No case of this type showed the symmetrical immobility and respiratory difficulty seen in cases of spinal muscular atrophy.

On examination at the ages of 5, 8, 9, 11, 12, and 17 years 3 of these children were mentally backward, whereas the others were of normal intelligence. 2 showed

the signs of flaccid diplegia, and 1 of mild spastic diplegia; 1 had spastic diplegia with athetosis and cerebellar ataxia, and 2 had double athetosis.

Mental Defect

In 8 cases (5 in males and 3 in females) amyotonia congenita had been diagnosed because of failure to pass the physical milestones at the normal age, combined with moderate generalised muscular hypotonia. Hypermobility of joints had not been striking in these cases, and the deep tendon-reflexes had been present in all, but they had been limp flabby babies and had made fewer spontaneous movements than does the normal child.

On examination at the ages of 2, 7, 8, 9, 10, 12, 14, and 14 years 2 of these children were imbeciles, and moderate hypotonia of the musculature persisted, although there were no other neurological signs. 4 patients were feeble-minded and their skeletal musculature remained somewhat flabby; another was a hyperkinetic backward child with subaortic stenosis; and another showed moderate mental defect, congenital nystagmus, and severe myopia, but no neuromuscular abnormality.

NUTRITIONAL AND METABOLIC DISORDER

Scurvy

The 2 children with scurvy were twin sisters who showed severe muscular flabbiness and lack of spontaneous movement during the first 8 months of life. They improved rapidly on treatment with ascorbic acid after radiographs had revealed probable scorbutic changes in the limb bones, and the diagnosis had been confirmed by the blood-ascorbic-acid levels. On examination at the age of 8 years they were healthy normal children.

No other examples of severe muscular hypotonia due to nutritional or metabolic disturbances in infancy were noted in this series; but I have subsequently observed manifestations of this type in a case of glycogen-storage disease—an event previously described by Clement and Godman (1950) and by Krivit et al. (1953).

SKELETAL AND OTHER CONGENITAL DISORDERS

Arachnodactyly

The child with arachnodactyly had had loose hypotonic hypermobile limbs in infancy, but spontaneous movements had been good and vigorous, and she had begun to walk at the normal age, though she had tended to be clumsy. On examination at the age of 15 she was healthy and active, without any neuromuscular abnormality; but she had long spidery fingers and toes, hypermobility of her joints, and a high arched palate. Her father was similarly affected.

Multiple Congenital Defects

The girl with multiple congenital defects had also been limp and flabby as a baby and had begun to walk late. On examination at the age of 8 years there was no evidence of neuromuscular disease; there was a mid-dorsal scoliosis, and radiography revealed that T4 was a hemivertebra and the left 4th rib was absent; she also had dextrocardia. Hypotonia in congenital heart-disease, such as Fallot's tetrad, has been described by Davison and Weiss (1929).

Congenital Dislocation of Hip

The diagnosis of amyotonia congenita in the patient with a congenital dislocation of hip was clearly a diagnostic error; lack of mobility and some hypotonia of the lower limbs, particularly the left, were later found to be due to dislocation of the left hip, and the patient made good progress once this was treated.

OTHER DISORDER

Spinal Ganglioneuroma

Progressive flaccid paralysis of the lower limbs in a male baby aged 6 months was later found to be due to a spinal ganglioneuroma.

Discussion

Brandt's (1950) conclusion—that the syndrome of amyotonia congenita, when taken to include all cases of generalised muscular hypotonia observed at, or soon after, birth, is due to many underlying disorders and not to a single disease—is confirmed by the findings in the present cases. It is evident that many babies presenting with this syndrome have spinal muscular atrophy and show the same inevitable deterioration as do those in whom the muscular weakness develops late in the first year. Although a few such babies survive for many years, and the disease appears to become arrested in some, yet without exception the children are left severely disabled and incapable of useful activity. In the infant afflicted with this disease muscular hypotonia and hypermobility of joints are profound; there are progressive impairment of spontaneous movement of the limbs and difficulty in respiration owing to intercostal weakness; the tongue may be seen to fasciculate; the tendon-reflexes are absent; and bulbar paralysis may ensue. In an advanced stage the flaccid immobile baby, with shallow yet laboured respiration and "rattling" of secretions in the pharynx, presents a picture so characteristic that it cannot be confused with any other disorder.

In an earlier stage of the illness, however, diagnosis may be much more difficult because many other conditions may give a similar picture of muscular hypotonia. In benign congenital hypotonia this manifestation may be striking and the baby may be almost as limp and floppy as one with spinal muscular atrophy. On the other hand, these infants are not paralysed; though weak and late in developing they generally show a good range of spontaneous movements of the limbs. Respiratory difficulty is uncommon; even when present it is never so severe as in cases of spinal atrophy. Furthermore these patients show neither fasciculation of the tongue nor bulbar paralysis, and the tendon-reflexes are usually retained, though they may be depressed. Clearly it is important to distinguish cases of this type from those with spinal muscular atrophy at the earliest possible moment, for their outlook is much more favourable. Negative findings on muscle biopsy may be of the greatest value in this context; in my experience biopsy in a case of spinal muscular atrophy never fails to show the characteristic appearances of denervation atrophy. I can offer no suggestion as to how to distinguish between the cases of benign congenital hypotonia which recover completely and those which improve but remain moderately disabled, except by follow-up studies. I have the impression that it is the less severely affected cases which recover completely, but at the moment this is no more than an impression. The nature of the neuromuscular abnormality in these cases is unsolved. Coërs and Pelc (1954) have found that in 1 case of "amyotonia congenita" (which may have been of this type) the motor nerve-endings, stained intravitally with methylene-blue, were "immature." Much work remains to be done before the significance of this finding can be appreciated, but it seems possible that this syndrome of benign hypotonia may result from varying degrees of abnormality in development of the neuromuscular apparatus. It appears that the term "benign congenital myopathy" (Turner) is a misnomer for cases of this type if "myopathy" is taken to mean, in its usual sense, "muscular dystrophy."

There remain to be considered the various cerebral, nutritional and skeletal disorders which in some of the present cases gave rise to generalised muscular hypotonia in infancy. It is evident that, although these children were limp and flabby and tended to "slip through the hands," the hypotonia and joint hypermobility were never so striking as in the cases of spinal atrophy. Nor, on the whole, were they so noticeable as in the benign

cases discussed above. Furthermore, spontaneous movements, though sometimes few, were never entirely absent. Of the children with cerebral palsy 4 had a history of possible birth injury; and as they grew older, abnormal postures, stiffness and clumsiness of the limbs, or involuntary movements appeared, while there was no muscular wasting; in these cases, too, the tendon reflexes were present throughout and sometimes exaggerated. In the mentally defective children it gradually became apparent that their delay in physical development was accompanied by a parallel deficit in emotional and intellectual attainments. The diagnosis of mental defect in infancy is never easy, but in these children the true state of affairs was generally apparent by the end of the first year of life. In the cases of scurvy, arachnodactyly, and the other conditions listed above, it also became clear with the passage of time that the moderate degree of muscular weakness and hypotonia shown by the patient was not due to a primary neuromuscular disorder. The same will usually be true in cases of malnutrition or in endocrine or metabolic disorders; usually signs of the primary disease, of which the hypotonia is but a symptom, will be evident. In glycogen-storage disease, for instance, hepatic enlargement will often be found. Furthermore, in patients with hypermobile joints due to congenital laxity of the ligaments there is no impairment of spontaneous movements or of muscular development, and often the condition affects more than one member of the family.

It is thus apparent that, in most cases diagnosed as amyotonia congenita, the nature of the underlying disease will be revealed as a result of repeated clinical observations, particularly during the first year of life. Cases of spinal muscular atrophy will deteriorate during this time, unlike benign congenital hypotonia, while in brain-injured or mentally defective children signs of the central nervous disorder, or a failure of intellectual development, may come to light. It is natural that an anxious parent will press for an answer at a first interview, but it is surely far wiser to temporise in any case of doubt than to give a gloomy prognosis which may not be justified by subsequent events. If doubt persists, as it may, after two or three interviews, it will often be necessary to admit the patient to hospital for observation and for investigations, including electromyography and muscle biopsy, which, if done with care, will always either confirm or refute a diagnosis of spinal muscular atrophy. If these studies and metabolic investigations are normal, it may still be necessary to await the appearance of involuntary movements—e.g., in cases of cerebral palsy—or signs of spontaneous improvement (suggesting a diagnosis of benign hypotonia) before making a final diagnosis.

The findings in this series of cases have led to the conclusion that the term "amyotonia congenita" should be discarded, unless it is used with the clear understanding that it refers to the syndrome of infantile hypotonia and is not taken to designate a specific disease. It is surely more satisfactory to call all cases of spinal atrophy, whether beginning at birth or subsequently, "infantile spinal muscular atrophy" or "Werdnig-Hoffmann disease." "Amyotonia congenita" should not be used to denote such cases, because in the minds of many physicians this diagnosis raises the possibility of spontaneous improvement. Furthermore, although the cases of "benign congenital hypotonia" referred to in this paper correspond most closely to Oppenheim's original description of amyotonia, it is preferable that these too should be identified by a new descriptive term such as the one given, in view of the many varied meanings which have become attached to "amyotonia" over the years. Clearly, all hypotonic babies require meticulous observation until the nature of the disease responsible for the muscular manifestations becomes apparent; only then may it be possible to offer an accurate prognosis.

Summary

The results are reported of a follow-up study of 109 cases which had been diagnosed as amyotonia congenita, usually in infancy, 2–25 years before.

In 67 patients the disease giving rise to generalised hypotonia and hypermobility had been progressive, and 55 of them had died between the ages of 5 weeks and 12 years. The 12 survivors were severely disabled and were aged 4–20 years at the time of follow-up. In these 67 cases the disease was clearly spinal muscular atrophy; whether the condition was present at birth or began late in the first year of life made little difference to the subsequent history of the illness.

Of the remaining 42 patients, 8 had recovered completely. 9 other patients had improved considerably but had remained moderately disabled throughout life, with general weakness and decrease in bulk of the skeletal musculature; the condition of these patients corresponded to descriptions of "benign congenital myopathy," but reasons are given for supposing that they did not have a true muscular dystrophy. It is suggested that the entire syndrome, embracing the cases which recover completely and those in which recovery is incomplete, may reasonably be called "benign congenital hypotonia." The two forms of this syndrome may be the different end-results of a similar neuromuscular abnormality present at birth; in some cases the condition may be entirely overcome by the processes of postnatal development, but in others some muscular disability persists. Another 5 patients were found to have muscle disease; 1 had a picture like that of benign congenital hypotonia but with myasthenic features, 3 eventually showed the characteristic features of progressive muscular dystrophy, and 1 was a case of polymyositis (chronic myositis fibrosa).

6 other patients were found on follow-up to have some form of "cerebral palsy," and 8 others were mentally defective and showed no sign of neuromuscular disease. In the remaining 6 cases it was apparent that the muscular hypotonia observed in infancy had been due to scurvy (2 cases), arachnodactyly, multiple congenital defects, congenital dislocation of the hip, and spinal ganglioneuroma.

The differential diagnosis of the many conditions which may give rise to the syndrome of amyotonia congenita (the limp floppy baby) is discussed. Many clinical observations at intervals may be required before the underlying disease can be accurately diagnosed. In difficult cases investigations such as muscle biopsy may be helpful. The term "amyotonia congenita" should be discarded, unless it is taken to mean the clinical syndrome of infantile hypotonia without any prognostic implications. Spinal atrophy should be called "infantile spinal muscular atrophy" or "Werdnig-Hoffmann disease," whatever the age of onset, and the name "amyotonia congenita" should not be used to denote cases of this type.

I wish to thank the physicians and surgeons of the National Hospital and of the Hospital for Sick Children for permission to consult their records and to follow up their cases; Dr. E. A. Carmichael and Prof. A. A. Moncrieff for encouragement and advice; the medical committee of the National Hospital and the research committee of the Hospital for Sick Children for their support; Dr. B. Kiernander and the staff of the department of physical medicine in the Hospital for Sick Children for making available many of the facilities necessary for this work; Miss M. Mayfield, the almoner, for assistance in tracing some of the cases; and Mrs. B. Wilson for valuable assistance in this survey.

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IDIOPATHIC HYPERCALCÆMIA OF INFANTS

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IDIOPATHIC hypercalcæmia of infants is of two types (Lightwood and Stapleton 1953, Lowe et al. 1954): benign or simple, with a good prognosis; and severe, with a bad prognosis and associated with mental retardation, a peculiar facial appearance, and osteosclerosis. In both types calcium metabolism is deranged apparently exactly as in vitamin-D intoxication (Creery and Neill 1954, Bonham Carter et al. 1955).

Four infants with so-called benign hypercalcæmia died in Dundee. Three studied at necropsy are reported here; all had gross nephrocalcinosis, and one had metastatic arterial calcification in the brain. The clinical features and pathology were compared with those of other diseases causing renal calcification. In particular, through the kindness of Dr. Agnes R. Macgregor, we have studied sections from the two cases of renal calcification which she described in the papers by Thatcher (1931, 1936) on hypervitaminosis D.

Case-reports

FIRST CASE

A girl, born spontaneously on May 6, 1955 (birth-weight 6 lb. 2 oz.), made good progress until the age of 6 months, when she weighed 17 lb. 4 oz. About then she suddenly became limp and pale for about 15 minutes but recovered rapidly. She had similar attacks at the ages of 8 and 8½ months. She developed anorexia and constipation, began to lose weight, and vomited occasionally. At the age of 9 months she was admitted to hospital on Feb. 8, 1956. She had been fed on National dried milk from the age of 2 weeks, and on admission she was receiving 30 oz. of full-cream National dried milk and about 1½ oz. of 'Farex' daily. She was given half a teaspoonful of cod-liver oil compound (400 I.U. of vitamin D) occasionally and a teaspoonful of 'Milk of Magnesia' every second day. Her parents and a sister were healthy.

On admission she was alert and of normal facial appearance, weighed 16 lb. 14 oz., was not dehydrated, and had no muscular hypotonia. No cardiac murmur was heard, and an electrocardiogram was normal; her blood-pressure was 120/70 mm. Hg. Radiography of her chest, abdomen, long bones, and skull showed no abnormality. Three estimations of the plasma-calcium level gave values of 12·7, 12·2, and 14·5 mg. per 100 ml. The blood-urea level was 48 mg. per 100 ml., plasma-phosphate level 4·5 mg. per 100 ml., plasma-chloride level 98 m.eq. per litre, plasma-bicarbonate level 20·1 m.eq. per litre, plasma-cholesterol level 375 mg. per 100 ml., plasma-albumin level 4·8 g. per 100 ml., plasma-globulin level 1·7 g. per 100 ml., plasma-alkaline-phosphatase level 18·5 King-Armstrong units, hæmoglobin 12·4 g. per 100 ml., and leucocyte-count 20,500 per c.mm. A catheter specimen of urine (pH4) contained a trace of protein and a few leucocytes and was sterile on culture.

Treatment and Course

The baby was treated with 'Locasol' (Trufood)—a dried milk low in calcium content—and oxytetracycline 250 mg. daily by mouth; the leucocytes disappeared from the urine, and she gained weight despite anorexia and occasional vomiting. On Feb. 26 she began to vomit more frequently and passed a loose stool from which no pathogenic organisms were isolated. Dehydration developed and was corrected with intravenous fluid. Oxytetracycline was added to the infusion, but despite this irregular pyrexia developed. On March 3 the plasma-calcium level was 11·4 mg. per 100 ml., plasma-phosphate level 3·5 mg. per 100 ml., plasma-alkaline-phosphatase level 12 King-Armstrong units, blood-urea level 17 mg. per 100 ml., plasma-sodium level 139 m.eq. per litre, plasma-potassium level 4·2 m.eq. per litre, and plasma-chloride level 89 m.eq. per litre. Intravenous therapy was discontinued, and locasol was given but was vomited; several loose stools were passed, but again no pathogenic bacteria were isolated. At this stage the administration of cortisone 25 mg. six-hourly, potassium chloride, and locasol by intragastric drip improved her condition and stopped the vomiting. Because the pyrexia continued, chloramphenicol was substituted for oxytetracycline. On March 5, however, vomiting recurred, and the infant again became dehydrated. An intravenous drip was started, but her condition deteriorated and she died next day, at the age of 10 months.

Necropsy Findings

The body was that of a dehydrated infant weighing 14 lb. 6 oz. The *kidneys* were of average size (rt. 25 g., lt. 21 g.), firm, and pale. The capsule was healthy and the cortical surface smooth. On section there were numerous foci of calcification in the outer medulla, forming radial white streaks, 1–2 mm. long, parallel with the line of the tubules. No deposits were seen in the apical half of the pyramids or in the cortex. The *ribs* showed sclerosis of the cortex near the costochondral junctions. Skull, lumbar vertebræ, femur, skeletal muscles, cardiovascular system (heart 30 g.), respiratory, alimentary, endocrine, lymphatic, hæmopoietic systems, and central nervous system (brain 925 g.) appeared normal.

Histology

The appearance of the kidneys is described in detail below. *Ribs*: the cortex was much thickened, but the trabeculæ were less affected. The bony architecture was normal. There was severe focal calcification of the media of a branch of the *middle cerebral artery* within the basal ganglia. No pathological changes were found in the brain and spinal cord. *Heart*: a minute thrombus on the posterior wall of the left atrium was undergoing organisation; no calcification was seen. *Liver* showed slight centrilobular atrophy. *Œsophagus* showed slight ulceration immediately above the cardia. Three *parathyroid glands* were found, of normal size and appearance. Lungs, tongue, submandibular salivary gland, stomach and intestines, pituitary, thyroid, and adrenal glands, pancreas, spleen, thymus, muscles, skin, internal genital organs, ureters and bladder, arteries, vertebræ, and femur appeared normal.

SECOND CASE

A report of this boy's illness has already been published (Morgan et al. 1956, case 2). He was admitted on Sept. 2, 1954, at the age of 8 months because of anorexia, vomiting, and constipation.

On admission his facial appearance was normal, and no cardiac murmur was heard. His plasma-calcium level was 14·8 mg. per 100 ml., blood-urea level 50 mg. per 100 ml., plasma-bicarbonate level 23·3 m.eq. per litre, and plasma-chloride level 97·4 m.eq. per litre. His urine (pH 7·5) contained

DR. WALTON: REFERENCES—*continued*

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a few pus cells but no protein. Radiographs of his skull and long bones were normal.

Treatment and Course

His condition improved on treatment with cortisone and a low-calcium diet, but on Dec. 29, 1954, diarrhœa and vomiting developed; his urine contained protein and pus, and culture of a mid-stream specimen yielded a growth of proteus. No pathogenic organisms were grown from his stools. He became dehydrated and was given intravenous fluid and intramuscular streptomycin 300 mg. daily. On Dec. 31, 1954, he had a small hæmatemesis, and his plasma-calcium level was 10·1 mg. per 100 ml., plasma-phosphorus level 6·4 mg. per 100 ml., and blood-urea level 95 mg. per 100 ml. By next day his condition had improved, and further improvement followed blood-transfusion. In spite of this improvement, however, he continued to vomit a little, and during the night of Jan. 3, 1955, he became restless, had another small hæmatemesis, and died in coma within an hour (age 1 year).

Necropsy Findings

The body was that of an ill-nourished infant weighing 13 lb. The right leg was slightly œdematous proximal to the site of an intravenous drip (permission to examine the leg veins was withheld). The *kidneys* (rt. 26 g., lt. 31 g.) were like those of case 1 (see below), but contained even greater deposits of calcium in the outer medulla, chiefly in the boundary zone. *Ureters* and *bladder* were normal. The *heart* weighed 35 g. Many branches of the *pulmonary arteries* within the lungs were almost occluded by old and recent thrombus. Both *lungs* were congested and contained small foci of early infarction at the bases. The *œsophagus* contained a little blood apparently derived from superficial erosions immediately proximal to the cardia. The *liver* (215 g.) had a nutmeg appearance. Examination of the central nervous system was not permitted. Skeletal and muscular systems and endocrine, lymphatic, and hæmopoietic systems appeared normal.

Histology

Kidneys: see below. *Lungs* showed early bronchopneumonia, hæmorrhage, and small foci of early infarction. The thrombus in the pulmonary arteries was undergoing organisation, and some was almost superseded by fibrous tissue. *Liver* showed severe fatty change. *Œsophagus* showed superficial ulceration and inflammation. Two *parathyroid glands* were found; both were normal. Arteries, stomach and intestines, thyroid, pancreas, adrenals, muscles, ribs, vertebræ, thymus, and spleen appeared normal.

THIRD CASE

A girl, born spontaneously on Dec. 2, 1954 (birth-weight 8 lb. 9 oz.), progressed satisfactorily until the age of 6 months, when she weighed 15 lb. 5 oz., but thereafter she became pale and listless and began to refuse her feeds. Once she appeared to inhale some milk, and a slight cough developed. There was no vomiting, but anorexia and listlessness persisted, and she was admitted at the age of 7½ months on July 23, 1955. She had been breast-fed for a week after birth but thereafter given National dried milk. Half a teaspoonful of cod-liver-oil compound (400 I.U. of vitamin D) was given daily from the age of 3 weeks; cereal foods were introduced at the age of 4 months. She was given fluid magnesia or milk of magnesia almost every night. Her parents and two brothers were healthy.

On admission she was pale, flabby, and of normal facial appearance, and smiled readily. She weighed only 13 lb. 3 oz. but was not dehydrated. No cardiac murmur was heard. Radiographs of her chest and long bones were normal. Her plasma-calcium level was 16·3 mg. per 100 ml., blood-urea level 63 mg. per 100 ml., plasma-sodium level 150 m.eq. per litre, plasma-chloride level 103 m.eq. per litre, and plasma-bicarbonate level 17 m.eq. per litre, Hb 11·9 g. per 100 ml., and leucocyte-count 20,500 per c.mm. Her urine was acid (pH not recorded) and contained no protein; a catheter specimen showed 1–2 leucocytes per high-power field, and *Escherichia coli* was isolated on culture.

Treatment and Course

Sulphadimidine 0·25 g. four-hourly was given for four days; the high level of plasma-calcium then became known, and intramuscular streptomycin 150 mg. twice daily was substituted. On this day the baby's temperature rose to 100·4°F and she vomited several times. By next day (Aug. 1, 1955) she was dehydrated although she had no diarrhœa, and her temperature had risen to 104·6°F; she then had a slight convulsion. Her urine contained only a few leucocytes and was sterile on culture. Intravenous fluid containing oxytetracycline was given, and by next morning her temperature had fallen to 99°F and she was less dehydrated. Her plasma-calcium level was now 9·6 mg. per 100 ml., blood-urea level 70 mg. per 100 ml., plasma-sodium level 139 m.eq. per litre, plasma-potassium level 3·1 m.eq. per litre, plasma-chloride level 109 m.eq. per litre, plasma bicarbonate level 18 m.eq. per litre, plasma-phosphorus level 3·3 mg. per 100 ml., plasma-albumin level 3·3 g. per 100 ml., plasma-globulin level 2·2 g. per 100 ml., and plasma-alkaline-phosphatase level 10 King-Armstrong units. Her Hb was only 11·0 g. per 100 ml., so a blood-transfusion of 85 ml. was given. Throughout this day she improved: she began to take interest in her surroundings and drank some milk, but she still vomited occasionally. The intravenous drip was stopped and oxytetracycline continued by mouth. She relapsed for no apparent reason during the following forty-eight hours and died in coma on Aug. 5, 1955, at the age of 8 months.

Necropsy Findings

The body was that of a dehydrated female infant weighing 12 lb. 14 oz. The *kidneys* (rt. 42 g., lt. 30 g.) were like those of cases 1 and 2; the only feature of note was the presence of heavy deposits of calcium confined to the outer medulla. Ureters, bladder, and internal *genitalia* were healthy. Both *pleural sacs* contained a slight excess of serous fluid, and the *right lung* showed partial collapse posteriorly. *Œsophagus*, *stomach*, and *intestines* contained a little blood apparently derived from superficial ulceration of the œsophagus immediately proximal to the cardia. The cardiovascular system (heart 34 g.), endocrine, skeletal, and muscular systems, lymphatic and hæmopoietic systems, and central nervous system appeared normal.

Histology

Kidneys: see below. *Lungs* showed slight chronic interstitial inflammation possibly resulting from aspiration. *Œsophagus* was ulcerated and inflamed at the cardiac end. Many nerve-cells in the *basal ganglia* and the Purkinje cells of the *cerebellum* showed terminal ischæmia. One *parathyroid gland* was found; it was histologically normal. Heart and arteries, tongue, stomach, intestine, liver, thyroid, pancreas, adrenal glands, muscles, skin, internal genital organs, ureter, bladder, rib, ilium, and vertebræ appeared normal.

HISTOLOGY OF KIDNEYS

Case 1

Calcification was not confined to the medulla, but the few deposits in the cortex were extremely small. Nearly all the medullary calcium was present in a granular amorphous form within foci of degeneration. These foci were of different sizes and shapes. Their numerical and anatomical distribution at different levels of the medulla suggested that they had developed in relation to the loops of Henle. Thus, most of them were situated in the outer half of the medulla, where about seven-eighths of the loops of Henle are said to turn back towards the cortex (Maximow and Bloom 1948); they were more sparse in the middle of the medulla and there occupied the position of the loops of Henle adjacent to and encircling the collecting tubules (fig. 1); and the few foci in the apical region of the pyramids were surrounded by collecting tubules.

Calcium had been deposited in the foci both in a finely granular form and in a coarser form. The deposits contained abundant alkaline phosphatase and showed disintegration of the supporting stroma and basement membranes, and necrosis of the epithelium of adjacent tubules. This latter change involved particularly those tubules in the position of loops of Henle and could be followed by their complete disappearance (fig. 1, cf. fig. 6). The collecting tubules also showed segmental disintegration, although generally these tubules were less severely injured; involvement of their basement membrane and epithelium was occasionally followed by narrowing of the lumen, but most of the collecting tubules within these zones of disintegrating tissue were distinctly dilated.

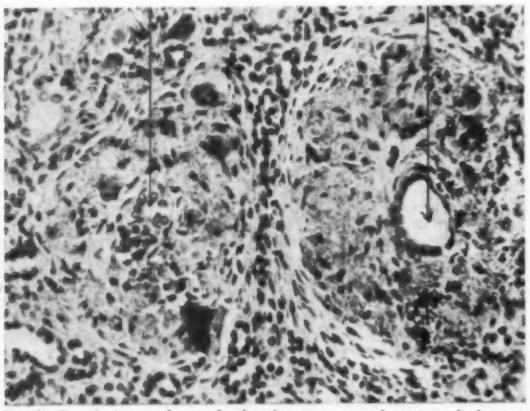

Fig. 1—Renal tissue of case 1, showing two granulomatous lesions at sites of amorphous deposits encircling damaged collecting tubules (arrowed). The histiocytic reaction is accompanied by giant cells, and fibrosis has developed at the periphery of each lesion. (Hæmatoxylin and eosin. × 229.)

These foci were infiltrated by histiocytic cells with twisted pyknotic nuclei; a few multinucleated giant cells were also present (fig. 1), but these were not all of foreign-body type, some apparently being shrivelled degenerating tubular epithelium. This granulomatous inflammation proceeded to fibrosis (fig. 1); hence, the presence of scar tissue round a dilated or a ruptured segment of a collecting tubule (cf. fig. 6 from case 3) probably indicated a former site of deposition of calcium and necrosis.

Some calcium had been deposited as concretions. Such deposits were rare in the medulla in comparison with the amorphous type, but the scanty minute cortical deposits were all of this nature and were similar to small deposits to be described in cases 2 and 3.

Signs of general tubular obstruction were slight—a few dilated collecting tubules, occasionally with non-calcified casts. The convoluted tubules were swollen and hydropic, as if filled with glycogen. A few glomeruli in the outer cortex were undergoing regression and obliteration, but most looked healthy. No vascular lesions were seen.

Cases 2 and 3

The changes in the kidneys were virtually identical in the two cases. There were massive deposits of calcium in the outer medulla, especially in the boundary zone (figs. 2 and 3). There were also a few minute deposits throughout both medulla and cortex.

Amorphous deposits of calcium, like those in case 1, were present throughout the medulla, but many of the granulomas were at a more advanced stage, with more fibrosis and much greater dilatation of the collecting tubules—weakened, presumably, by damage to their basement membrane and by disintegration of the surrounding tissue.

Most of the deposits of calcium in the medulla, however, consisted of concretions of various sizes, and these looked deceptively like calcified hyaline casts obstructing dilated tubules (figs. 2 and 3). This impression of an intratubular situation was strengthened by the flattened cells lining some of the spaces in which the concretions lay, but examination of an early lesion (fig. 7) showed that such cells were mesenchymal and not tubular epithelium. Most of the surviving tubules were dilated collecting tubules with flattened but distinctive epithelium Many were distorted, and some were almost obliterated by deposits of calcium immediately outside their stretched-out epithelium; but others were widely dilated, despite the proximity of large concretions, and some contained hyaline non-calcified casts.

Inflammation at the sites of these calcified concretions was slight; in some of the small deposits there was a mild cellular reaction of histiocytic type, and around the large lesions tubules were compressed and atrophied and there was mild fibrosis. Some of the dilated collecting tubules contained a few polymorphs, but there was no other evidence of pyogenic inflammation.

The mode of evolution of the large deposits of calcium—in all three cases—can only be inferred by analogy with smaller lesions. Thus, in one of the smallest granulomatous lesions (fig. 4) amorphous calcareous material had apparently been precipitated not in but between the medullary tubules. The tubules were damaged and compressed; their basement membrane had disappeared; and their epithelial lining, attenuated and necrotic, was invaginated by the interstitial calcium now in direct contact with its outer surface. In another small lesion (fig. 5) the calcareous material was again interstitial, but here irregular concretions of varied size and density surrounded and compressed the adjacent limbs of Henle. Not all the calcium in such lesions was extratubular, however, for (as this figure shows) calcification had transgressed the basement membrane of one of the tubules and involved its epithelial lining cells but not the hyaline cast in its lumen.

A few of the concretions invaginating the epithelial lining of collecting tubules (fig. 3) appeared to lie between

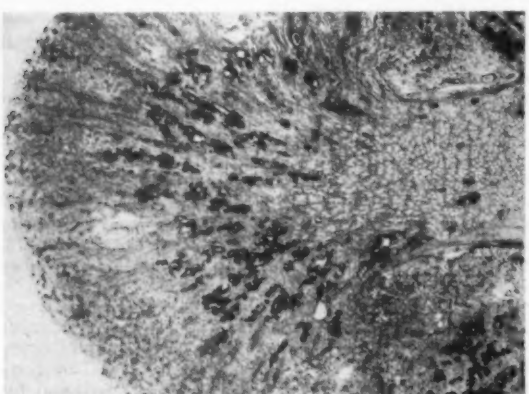

Fig. 2—Renal tissue of case 3, showing calcification of outer half of medullary pyramids. (von Kossa counterstained with orange G and neutral-red. × 8·3.)

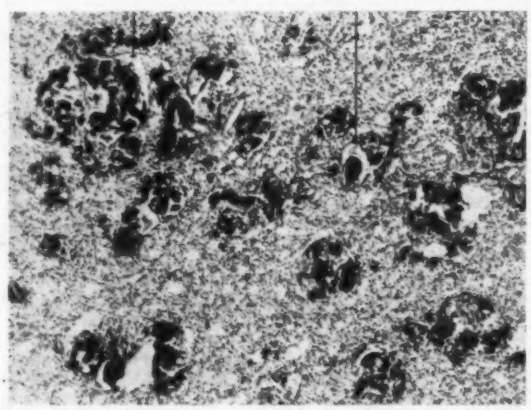

Fig. 3—Renal tissue of case 2, showing deposits of calcium in boundary zone, and cystic collecting tubules (arrowed) distorted by contiguous masses. (Hæmatoxylin and eosin. × 44.)

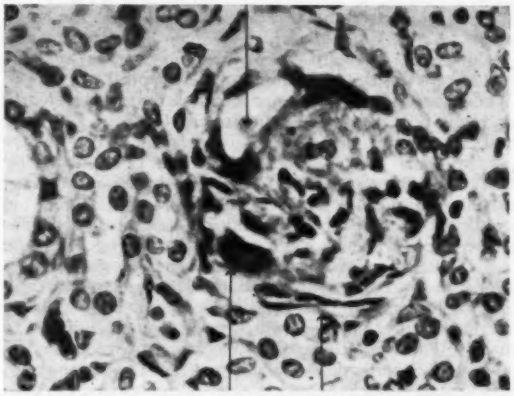

Fig. 4—Renal tissue of case 3, showing early and apparently intertubular lesion. Calcifying interstitial tissue is infiltrated with histiocytes. Tubules (arrowed) are compressed and show degeneration of epithelium and destruction of basement membrane. Top arrowhead lies on hyaline cast. (Hæmatoxylin and eosin. × 535.)

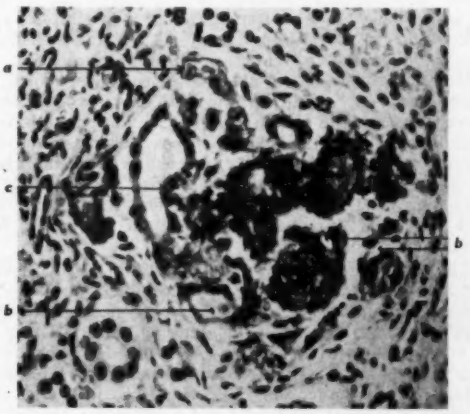

Fig. 5—Renal tissue of case 2, showing interstitial calcium concretions compressing tubules: *a*, laminated concretions; *b*, lumen of compressed tubules; *c*, calcification of epithelium of cast-containing tubule. (Hæmatoxylin and eosin. × 275.)

the epithelium and the basement membrane. These concretions also are believed to have originated outside but up against the tubules, as in fig. 7, for reticulin stains seem to show that the delicate intervening stroma may disappear and the once interstitial calcium now lies within the tubule, although still outside its epithelial lining. This illustration also shows how tubular distortion, comparable with that seen in the big deposits, can be produced from without by quite small interstitial concretions close to the basement membrane.

Cortical deposits of calcium were small and scanty. As in case 1, they appeared to be primarily interstitial, but in a few instances calcification had apparently involved some of the adjacent tubular epithelium. Signs of tubular obstruction within the cortex—dilatation of tubules and formation of hyaline casts—were less than would be expected from such gross medullary lesions, but the "bulk" of the convoluted tubules was considerably less than normal—the result, apparently, of atrophy or of failure of growth rather than of destruction. Most of the glomeruli were healthy, but some in the outer cortex were small and covered by prominent cuboidal epithelial cells and looked immature; a few of these superficial glomeruli also showed partial sclerosis, but there was no evidence of active glomerulitis. No vascular damage was seen.

Discussion

The distinction between idiopathic hypercalcæmia of the simple type and infantile renal acidosis rests mainly on the biochemical findings. Thus, the normal values of the plasma-bicarbonate level in cases 1 and 2 reasonably exclude renal acidosis. On the other hand, all the biochemical changes in case 3 could be found in either syndrome. Nevertheless, although the plasma-bicarbonate level is low, we accept the combination of a high plasma-calcium level, a normal plasma-chloride level, and an acid urine in the absence of dehydration as indicating idiopathic hypercalcæmia.

The two forms of idiopathic hypercalcæmia have been differentiated by clinical and radiological criteria since the biochemical changes do not provide a clear distinction. Despite their fatal outcome our cases conformed with the simple, so-called benign, type. However, the validity of the criteria used is by no means certain, and gradations between the two forms are now being recognised (Russell et al. 1954). The peculiar facial appearance, believed by some to be distinctive (Schlesinger et al.

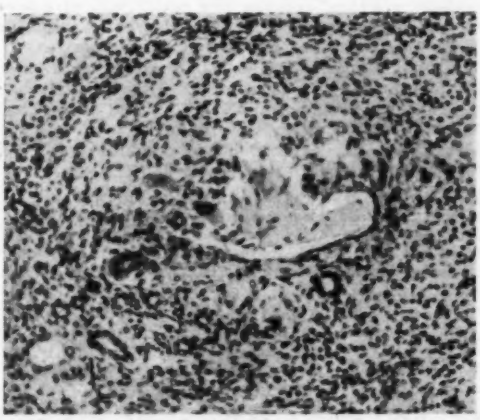

Fig. 6—Renal tissue of case 3, showing repair of focus of destruction in medulla. Cystic space in scar tissue is partially lined by epithelium and contains a large cast. Hardly any calcium can be seen. Giant cells, some possibly derived from tubular epithelium, are present in scar tissue. (Hæmatoxylin and eosin. × 165.)

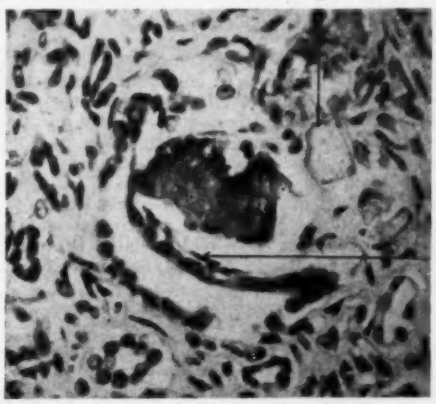

Fig. 7—Renal tissue of case 2, showing interstitial cast-like concretion distorting a collecting tubule. Another concretion, less intensely stained, is forming at *a*. Flattened cells (*b*) outside the tubular basement membrane line the interstitial "space" in which the concretion has formed. (Hæmatoxylin and eosin. × 386.)

1956), may indicate the severe type of illness, and certainly its occurrence has not been established in simple hypercalcæmia; it was absent from all our cases. Radiography does not provide an absolute distinction, for osteosclerosis, present in all cases of the severe form, has been observed, albeit of minor degree, in the simple form (Creery and Neill 1954); it was not detected radiologically in any of our cases but was found at necropsy in case 1. Finally, a cardiac murmur, absent in all our cases, has been heard in infants with the simple type (Lowe et al. 1954, Creery and Neill 1954) and has been absent in some cases of the severe form (Schlesinger et al. 1956).

The renal lesion of simple hypercalcæmia is not specific, for interstitial and subepithelial calcification has been observed in infantile renal acidosis (Butler et al. 1936, Doxiadis 1952) and as an incidental finding at necropsy in various diseases of infancy (A.M. Macdonald, personal communication). Glomerular immaturity and small tubular mass have also been noted in chronic renal acidosis of infants without renal calcification (Hutchison and Macdonald 1951). These features, in our opinion, are not the cause of renal calcification and may simply be the consequences of failure to thrive. None the less the possibility of direct glomerular damage cannot be excluded in view of the findings in the severe form of the disease; these, according to Schlesinger et al. (1956), may range from minute foci of calcification throughout the cortex and medulla to gross cortical destruction. Admittedly the severe cases have been characterised by prolonged and recurrent urinary infection, but the glomerular lesions have apparently not been regarded as infective, and Schlesinger et al. suggest that hypercalcæmia may itself cause glomerular damage. The greatest glomerular and cortical tubular destruction was found in the three severe cases of longest duration, whereas in the fourth case (Dawson et al. 1954) glomerular changes were as slight as in our cases of simple hypercalcæmia, which proved fatal at a comparable age.

Mental retardation has been present in all infants with the severe type of idiopathic hypercalcæmia who have survived to the age of 2 years (Schlesinger et al. 1956) but not in infants who have recovered from the simple type. The three infants we have described did not appear to be mentally retarded, but all died within the first year of life. Neuronal damage in one of the two brains examined at necropsy (case 3) was probably caused by terminal anoxia and not directly by the hypercalcæmic state. Nevertheless the calcification of a cerebral artery in case 1 shows that there is a risk of cerebrovascular damage even in the simple form of idiopathic hypercalcæmia.

Hypervitaminosis D presents striking resemblances, clinical and biochemical, to idiopathic hypercalcæmia. Radiologically there are insufficient data in the published reports of vitamin-D intoxication to allow an adequate comparison; nevertheless osteosclerosis comparable with that seen in hypercalcæmia of the severe type has been recorded (Hess and Lewis 1928, Ross 1952). The cause of osteosclerosis in the two diseases has not been established, but its appearance and regression in idiopathic hypercalcæmia seem to be related to episodes of impaired renal function (Harris 1954, Schlesinger et al. 1956).

The diagnosis of hypervitaminosis D in fatal cases of renal calcification, such as those of Thatcher (1931, 1936) has been criticised by Wolf (1943), who considered that the dosage of vitamin in these cases was too small to cause metastatic calcification except in the presence of some underlying disorder—e.g., severe renal disease. By his own experiments, however, Wolf confirmed that vitamin D in large doses can cause nephrocalcinosis in "healthy" infants. The rôle of vitamin D in Thatcher's cases cannot now be assessed, but review of the histological changes in the kidney has shown them to be essentially the same as in our cases of simple hypercalcæmia (A. R. Macgregor, personal communication), in which the daily intake of vitamin D was at least 2000 I.U. at the time of admission to hospital.

The cause of death of our three infants was clearly not renal failure, despite the involvement of so many renal tubules by the deposits of calcium. We believe that the death of the second infant was precipitated by acute bronchopneumonia and widespread pulmonary thrombosis; and, theoretically, the formation of thrombus—conceivably initiated by emboli from veins in the leg—might have been favoured by cortisone (Cosgriff 1951) as well as by the hypercalcæmic state. No adequate explanation for the deaths of the first and third infants was found. One factor common to all three was persistent vomiting which proved very difficult to control. Even so, the plasma-electrolyte levels did not indicate a biochemical disturbance serious enough to cause death. Unexplained deaths have previously been recorded in idiopathic hypercalcæmia (Harris 1954, Dawson et al. 1954), and equally mysterious deaths in hypervitaminosis D, with renal calcification as the only gross lesion, have been attributed to a direct toxic action of the vitamin (Bauer and Freyberg 1946).

However close the resemblance between the two conditions—and the facts are surely suggestive—the evidence implicating vitamin-D intoxication in idiopathic hypercalcæmia is at best circumstantial. Nevertheless so many factors may enhance the toxicity of vitamin D (Wolf 1943) that, until the cause of idiopathic hypercalcæmia is found, the amount given to infants should be kept under constant review.

Summary

The clinical and pathological features of three fatal cases of the simple form of idiopathic hypercalcæmia are described and compared with those of the severe form and of hypervitaminosis D.

The deaths of these three infants have not been satisfactorily explained, but a fatal outcome may possibly have been precipitated by persistent vomiting.

Renal calcification was the salient pathological feature in all three. Most of the deposits of calcium were in the outer medulla, the cortex being only slightly affected. Some of the medullary deposits appeared to be closely related to the loops of Henle and contained amorphous calcium; such deposits were associated with focal degeneration of both interstitial tissue and tubules and with granulomatous inflammation. The rest of the medullary calcium, and the few small cortical deposits, consisted of concretions in the interstitial tissue, and these produced tubular compression and distortion.

The renal lesions are not specific, similar changes having been found in cases ascribed to hypervitaminosis D and in infantile renal acidosis, as well as in association with various other diseases of infancy.

Metastatic calcification of a cerebral artery and osteosclerosis were present in one of the cases.

We are grateful to Prof. J. L. Henderson and Prof. A. C. Lendrum for their advice and criticism, and to Dr. A. R. Macgregor and Dr. A. M. Macdonald for their generous help and for allowing us to study their cases. The histological sections and photomicrographs were prepared by Mr. R. S. R. Fawkes, A.I.M.L.T.

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PARTIAL GASTRECTOMY FOR PEPTIC ULCERATION IN THE AGED

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"There is no one so old but thinks he can live a year."—Cicero.

SAFE elective surgery is making an increasing contribution to the care of the aged. Advances in anæsthesia, antibiotics, nutrition, and techniques have made genito-urinary, orthopædic, and cancer operations safe in the elderly. The old are benefiting from surgery as well as the young. To be freed from a handicap which conditions life, thinking, and relationships is a gift to the old and a joy for remaining years. Gastric surgery has lagged behind other specialties in applying rational principles of treatment to the older patient.

Peptic ulceration is no respecter of age or income group; and, though the usual onset is in the twenties, thirties, and forties, the relapsing nature of the disease means that many old people suffer from it. But in our experience many septuagenarians and octogenarians may show the disease for the first time often in a virulent form. The old people frequently need surgical relief and should not be denied it solely on fullness of years. Often they are good subjects. They are almost all lean and have escaped the ravages of atheromatous accidents, which may have carried away their fatter and perhaps more sanguine brethren in their sixties.

We wish to show that partial gastrectomy, the established and rational surgical treatment for chronic peptic ulcer, is feasible and safe in patients over the age of 70. In our experience these patients have been among our most grateful and gratifying.

It is an accepted tenet in the treatment of malignant disease that a major operation, soon forgotten, is worth while even for a year of comfortable life. Why not extend the principle to this undermining and debilitating complaint in which the sufferers may have several years of high-quality life before them? As people grow older their interests often narrow, and life may even revolve around their gastric symptoms. To do away with these symptoms raises their level of happiness, and their minds are free for more constructive purposes.

We analyse here our experience in 30 consecutive cases of elective partial gastrectomy in patients over 70 and endeavour to answer some of the questions this thesis inevitably raises.

Investigation

The history and clinical examination were the most important investigations. Most patients had fifty minutes' history-taking and ten minutes' physical examination. In this way the disability caused by the ulcer was carefully assessed.

All 30 patients had barium meals, and 29 had fractional test-meals. The barium meals showed evidence of ulceration in 29 cases, and in the 30th a shallow ulcer was seen at gastroscopy. The test-meals were not in any way conclusive but suggested what lesion was likely to be present. The average top readings for gastric ulcer were 50/25 *N*/10 HCl, whereas the average top readings for duodenal ulcer were 75/45. The preoperative weight of all these patients average the low figure of 8 st., ranging from 5 st. 9 lb. to 12 st.

INDICATIONS FOR SURGERY

Why operate on these patients? They have run their allotted span of three score and ten years. The first and greatest indication is persistent symptoms. Our operations were considered with the patients' symptoms in view. A patient does not mind having a disease if he has no symptoms. It follows that the greatest surgical symptom—pain—was our principal indication. If there is constant and recurring pain and a history of a dramatic episode, such as bleeding or perforation, then the decision is easily made.

The second factor is the insurance and prophylaxis that operation confers. Mulsow (1941), reviewing peptic ulceration in the aged, found that 33% of the deaths due to peptic ulceration were in patients aged more than 60. Patients do not die from uncomplicated peptic ulcer, though it may contribute to other causes of death. In gastric ulceration the spectre of carcinomatous change is always present, but the real threat to life comes from complications that require emergency surgery. We have found that Cole's (1953) statement "The aged tolerate elective surgery well but emergency surgery poorly" is true. The mortality of perforation and hæmorrhage in the aged is high, whether they are managed medically or surgically. Hæmatemesis has a mortality of 15·9% in patients aged more than 70 (Fraenkel and Truelove 1955). Mortality mounts with recurrent incidents, and 4 of our patients had previous perforations or hæmorrhages. Many patients survive emergency operations only to succumb to postoperative complications. They will often stand an operation but fail to stand a complication.

The third factor is physiological. Old patients do badly with prolonged rest in bed, the traditional pillar of medical treatment. There are many objections to this. The dangers of mental deterioration, thrombosis, contractures, bedsores, anorexia, and constipation are now well recognised. As well as this the repair-destruction cycle has taken place so often that it is too much to expect that the mobile mucosa will ever be adequately restored. Mechanically unsound duodenums and attenuated cicatrised lesser curvatures do not improve on rest in bed. An exception to this is the giant gastric ulcer of late, possibly arteriosclerotic, origin, which often shrinks dramatically on medical treatment and may even be quite silent.

Economics is another consideration. A third of our patients had no other means of support than the old-age pension, and many more had little else. These people could not afford to sustain indefinitely the long-tried gastric diet with its expensive egg-and-milk basis. We have learnt not to recommend chicken to old-age pensioners; they simply do not get it. Coöperation for long-term medical treatment is not so readily obtained in later life when living habits have become fixed and more difficult to change.

Most important is the patient's mental outlook. The answer to such a simple and direct question as "How long do you want to live?" often brings an answer which helps in making a decision about surgical treatment. In the earlier patients we found that the decision to operate was imposed on us, but increasing confidence based on success has enabled us to be more positive in our recommendations.

PREOPERATIVE CARE

Vital capacity and hæmoglobin were estimated and improved on if possible. Supervised breathing exercises

DR. RHANEY, DR. MITCHELL: REFERENCES—*continued*

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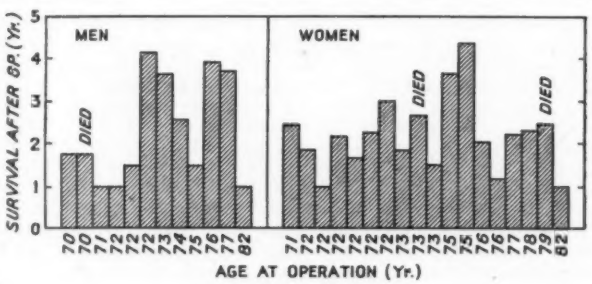
were taught to each patient, and careful inquiry was made into the possibility of the presence of a "cold" and, if such were found, operation was postponed for at least ten days after the acute infection. Trial doses of any drugs likely to be used, such as pethidine and promethazine, were given.

Most of our patients with recent symptoms of ulcer activity were given two or three weeks' rest in bed during these investigations, for we have learnt that there is a world of difference in the safety with which one can close the necrotic as opposed to the fibrotic duodenum, and the extra rest in bed often converts the necrotic to the fibrotic. We have also the greatest respect for the giant posterior lesser-curve gastric ulcer penetrating the pancreas—we prefer to remove it when healed.



Survival after operation.

"KEEP DEATH OFF THE TABLE"

Half the cases were operated on under local anæsthesia. Almost half the remainder underwent balanced anæsthesia of "local" infiltration with light general anæsthesia. We used an anterior field and splanchnic block with 1 in 2000 amethocaine hydrochloride. We have given up using adrenaline in the solution because of its occasional tendency to initiate auricular fibrillation; we have seen no toxic effects as a result of this. Premedication that is accurate in timing and dosage is essential for success, and pethidine and promethazine as adjuvants are most useful drugs.

The use of local anæsthesia presupposes an accurate established diagnosis and a planned operation. Trauma, fumbling, and purposeless movements must be avoided. More patients are suitable for local anæsthesia than are surgeons. To have a conscious patient with one in the theatre is to be constantly reminded of the fragile nature of the person entrusted to one's care. This is so easily forgotten under general anæsthesia, especially when one is confronted with some unusual technical problem.

Paul, of Liverpool, said: "Gentleness comes from the heart rather than from the hand." Under local anæsthesia gentleness is essential, and one quickly learns which are the traumatising parts of the operation. Unnecessarily moving heavy retractors upsets the patient as much as does ligature of the left gastric pedicle.

For the firm surface of the average operating-table was substituted an inflatable 'Lilo,' which is much more comfortable for the patient and reduces the possibility of phlebothrombosis. Comfort is important because nearly all these operations took longer than two hours. When possible the patient was transferred from the operating-table direct to bed.

From our experience of emergency surgery for gastro-intestinal hæmorrhage in the aged we have learnt that, in some cases where the tissues look poor, it is well to reinforce our two-layer catgut anastomosis with a third layer of interrupted linen, thus forestalling the serious risk of delayed healing. Before we close the abdomen, the splenic area is checked for the presence of blood, because a few ounces left to pool here may help to start an atelectasis at the left base.

AFTERCARE

"In the aged more than half the postoperative deaths are due to bronchopneumonia" (Carp 1948), and we are constantly mindful of this. Intramuscular penicillin 250,000 units six-hourly is given routinely for five days.

So far as possible we try to have the same nurses caring for the patient, and the position of the bed in the ward is not altered. This helps to prevent a confusional state.

Most of the patients did not have an intravenous infusion, which tends to immobilise them; where it was essential, an effort was made to have a temporary rather than a continuous drip. Rectal fluids are absorbed well by the prepared colon, and this was the method most often used during the first seventy-two hours.

A close watch is kept for phlebothrombosis, and early mobilisation is tempered with discretion and mercy; older tissues take longer to repair. Diarrhœa is a most serious complication in old people, and a "wait and see" attitude to it may be dangerous.

Our patients left hospital after twenty-one days, and many had a further two weeks' convalescence.

THE PATIENTS AND THEIR LESIONS

30 patients aged more than 70 had partial gastrectomies in four and a half years from February, 1950, to August, 1954: 18 were women and 12 men. In 10 the only means of support was the old-age pension.

17 had gastric ulcers, 8 had duodenal ulcers, and 5 had signs of both. Of the 17 gastric lesions 12 were in women, and of the 8 duodenal lesions 6 were in men. Of the 5 patients with combined lesions 4 were women; 2 had their operations for duodenal ulceration, 1 for gastric ulceration, and the remaining 2 because of the combination. 10 of the patients had duodenal ulcers alone or combined with an element of stenosis.

An interesting subgroup were 4 patients who had hour-glass stomachs. Their histories were from fifteen to thirty-five years, the average being almost twenty-five.

12 of the gastrectomies were of the Billroth-I pattern, and the remainder were Polyas with a Finsterer-Lake valve.

The survival of the patients is charted in the accompanying figure.

IMMEDIATE COMPLICATIONS

Death is the most important complication of operation. There were no deaths immediately or remotely connected with the operations. There were 2 severe chest infections. 1 paralytic ileus was overcome by aspiration and intravenous fluid. We had 1 burst abdomen.

FOLLOW-UP

All our patients were followed up as outpatients or visited in their homes by one of us. 3 now have incisional hernias.

From one to five years after operation the average of 27 hæmoglobins was 91%, and only 2 were below 80%. In 13 patients the weight was unchanged—i.e., within 7 lb. of their preoperative weight. 8 gained weight, the average gain being 14 lb., with a maximum of 23 lb. 6 lost weight, the average being 12 lb. and the maximum 19 lb. There were no jejunal ulcers, actual or presumed, at the end of the period.

Most of the patients were delighted with their operation, and on the whole we considered that their capacity was normal and that they were less liable to have post-gastrectomy symptoms than are younger folk. Perhaps this is because the gastric remnant is more lax and distensible in older people. "Wonderful," "Never

better in my life," " New lease of life," " Not so well for years," " Christmas dinner with all the trimmings "—these are fair sample comments. Our one poor result was in a woman whose ulcer did not show on barium meal but was discovered on gastroscopy. Postoperative gastric biopsies show that she has a concomitant gastritis, and this rather than the ulcer is probably the cause of her symptoms.

3 patients have since died. Their deaths have been unconnected with surgery. Cerebral thrombosis claimed one, a carcinoma of the splenic flexure with hepatic secondaries claimed another at the end of two and a half years, and the 3rd died of coronary thrombosis associated with chronic myeloid leukæmia after twenty-one months.

Partial Gastrectomy as Operation of Choice

Almost two-thirds of our patients had gastric ulcers. Here the choice was simple: it was either gastrectomy or nothing.

The most contentious part of this paper is the selection of partial gastrectomy as the surgical procedure of choice for duodenal ulceration.

Partial gastrectomy is the long-established rational treatment, whereas gastro-enterostomy is largely discredited at present. But gastro-enterostomy is often recommended for the aged; it is said to be quicker, safer, and equally effective. Yet speed is not an important factor in a gastric operation, and shock is no longer a complication of gastrectomy. Gastro-enterostomy is not safe, because it is not equally effective. After operation the patient may get relief of symptoms but is subject to the same lethal complications of peptic ulceration as before. He is subject to the same complication that has led to the abandonment of gastro-enterostomy in younger people—the hazard of marginal ulceration. We could trace no evidence that older people are less liable to marginal ulceration. The issue with which it has been confused is that there is a decrease in gastric acidity coincident with the advance of age, especially in men (Vanzant et al. 1932). But peptic ulceration in general is as common in the aged as it is in other age-groups:

" 10% cases of peptic ulceration occur in persons over sixty. The age distribution of the general white population of the United States is just 10·8% over the age of sixty." (Mulsow 1941.)

Our opinion is that, although the gastric acidity is decreased, the mucosal resistance is also decreased, and the end-result is peptic ulceration.

The proof that jejunal ulceration develops after gastro-enterostomy is from fact and inference:

Kiefer and McKell (1947) found 4 jejunal ulcers following gastrojejunostomy in patients aged more than 65. 2 of these ulcers occurred in patients whose initial symptoms of peptic ulceration began at the age of more than 70.

One of us did a low Polya gastrectomy as an emergency for bleeding from a duodenal ulcer in a man aged 71; a year later he had a further operation for closure of a perforated anastomotic ulcer.

Charles Wells (personal communication) writes: " Even the development of pyloric stenosis is an indication of continued activity. The element of fibrosis is by no means an indication of diminished virulence. The incidence of marginal ulceration after gastro-enterostomy is no less in old people than it is in the young."

Ivor Lewis (personal communication) says that, if the duodenum is opened as the first step of the operation in cases of pyloric stenosis, one will nearly always find an actual ulcer still present. This proves the dangers of stomal ulceration, which he found " fairly frequently."

Decreased acidity is often caused by the gastritis which is secondary to pyloric hold-up. When this is overcome by gastro-enterostomy without attention to its precipitating factor, peptic ulceration, the gastritis resolves and the acidity increases again.

Conclusions

Given adequate indications and careful preparation, surgical treatment for peptic ulceration in old people is safe.

Partial gastrectomy has given promising results in our hands.

Summary

Peptic ulceration, recurrent or new, is common in the aged; they stand its complications poorly.

When elective surgery is indicated, we believe that partial gastrectomy is the operation of choice.

30 consecutive elective partial gastrectomies in patients aged more than 70 are reviewed. There were no deaths due to operation. All of these patients have been followed up.

We wish to thank Professor Wells and Mr. Ivor Lewis for their personal communications.

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SPORADIC NON-ENDEMIC GOITROUS CRETINISM

HEREDITARY TRANSMISSION

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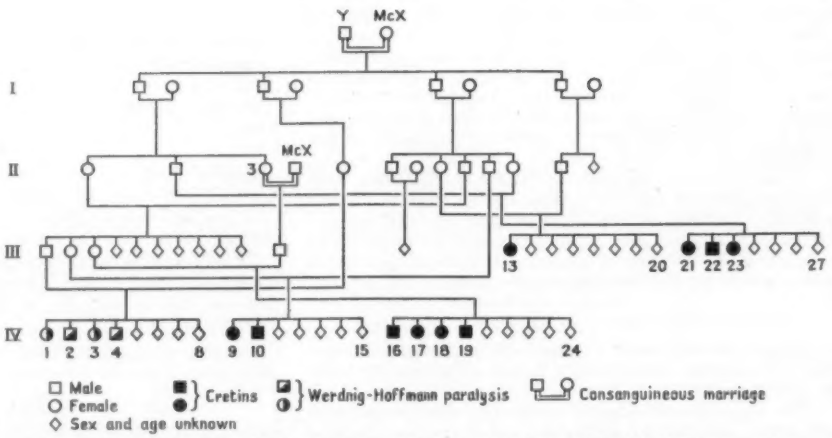
ENDEMIC cretinism results from a severe lack of iodine over several generations and is almost invariably associated with goitre. The common type of sporadic non-endemic cretinism, on the other hand, is not associated with goitre; indeed it is usually considered to be due to an embryonic defect in the development of the thyroid gland (Dorff 1934), which is often assumed to be absent. Nevertheless radioactive-iodine (^{131}I) studies of cretins who, on clinical examination, seem to have no thyroid tissue at all have sometimes revealed enough ^{131}I in the neck to suggest that some thyroid tissue is present (Quimby and McCune 1947, Silverman and Wilkins 1953), which may be either ectopic or undescended (McGirr and Hutchison 1955), confirming an early anatomical observation in cretinism (MacCallum and Fabyan 1907).

The underlying cause of sporadic cretinism remains unknown. Childs and Gardner (1954), who, seeking evidence of a hereditary tendency, investigated the families of 90 cretins, found that, though there seemed to be such a tendency, a familial prevalence was distinctly uncommon. Consanguineous matings among the parents of the cretins was not strikingly commoner than in a control series of normal children.

In contrast to this type of sporadic cretinism is what has been described as " sporadic cretinism associated with goitre." In this type of case familial prevalence and consanguinity of the parents are common (Osler 1897, Lerman et al. 1946, Hurxthal 1948, Stanbury and Hedge 1950, Hubble 1953, McGirr and Hutchison 1953, Wilkins et al. 1954, Hutchison and McGirr 1954, Sexton and Mack 1954, Stanbury et al. 1955a, 1955b), but isolated

cases without any apparent familial prevalence have also been reported (Osler 1897, Hamilton et al. 1943, Stanbury 1951, McGirr and Hutchison 1953, Wilkins et al. 1954, Hutchison and McGirr 1954).

None of these cases of sporadic non-endemic goitrous cretinism has been due to deficiency of iodine or to the ingestion of goitrogens. Obviously in all of them the hypothyroid state was due, not to a simple lack of thyroid tissue (as it is in the common sporadic non-goitrous cretin), but to an inability on the part of the thyroid gland to meet the body's requirements, even after considerable enlargement of the gland, most probably as the result of stimulation by thyrotrophin produced by the pituitary gland in response to a hypothyroid state.



Pedigree of itinerant tinkers, showing appearance of goitrous cretinism and Werdnig-Hoffmann paralysis.

Our understanding of the pathogenesis of goitrous cretinism has been greatly furthered by the use of radioactive iodine (^{131}I). Excessive avidity of the thyroid gland for iodine has been a constant feature of these cases, but evidence has also accumulated which suggests a block in the synthesis of the thyroid hormone. Discrepancies between the findings of different workers indicate that the block is not always at the same stage in every case. It seems likely that this block is due to enzyme deficiencies at different levels of synthesis in different cases.

The high prevalence of goitrous cretinism in the families of our patients led us to postulate that the condition may be due to an inborn error of metabolism (Hutchison and McGirr 1954). A similar opinion has been expressed by Wilkins et al. (1954) and Childs (1954).

We have since been able to add considerably to the family tree of our largest family group (cases 1–7 and 13 of Hutchison and McGirr 1954) and to correct some of the inaccuracies previously reported to us. The fuller details of this remarkable family seem worthy of record.

Y-McX Family Group

Such details of the family tree as have been discovered are shown in the accompanying figure. The members of this family group are itinerant tinkers living in Kintyre, Argyll, and the Isle of Islay, Scotland. From time to time they travel in other parts of Scotland, and very probably other members of the family group are scattered throughout the country, although we have not found it possible to trace any with certainty. These people are always on the move; and this fact, combined with the distance from Glasgow of their usual haunts, explains our difficulty in collecting accurate data. Even now we have reasons (see below) to believe that the family tree given here by no means exhausts the ramifications of the Y-McX genes throughout Scotland.

The original male Y came from Ireland to Scotland about 160 years ago and settled as a blacksmith at Southend, Kintyre. He married a McX, his full cousin. A female Y (II.3) married another McX, who was her full cousin. We have not been able to obtain a satisfactory pedigree of the main McX family, which is probably scattered widely throughout the West and North of Scotland. So far as we know, none of the marriages in generation I of the Y family was consanguineous, but in generations II and III the amount of intermarriage has been astonishing, and possibly largely brought about by the increasing demarcation and isolation of these people by the rapidly widening gulf between their mode of existence and that of the other inhabitants of the country.

The family tree (see figure) shows that 10 known goitrous cretins (III.13, 21–23, and IV.9 and 10 and 16–19) have appeared among 31 persons in four lots of siblings (III.13–20; III.21–27; IV.9–15; and IV.16–24): 6 females and 4 males—an approximately equal sex-distribution. The results of radioactive iodine studies in 8 of these have already been published (cases 1–7 and 13 of Hutchison and McGirr 1954). The 9th cretin (III.21) is the elder sister of III.22 and III.23 (cases 7 and 6 of Hutchison and McGirr 1954). One of us has examined her clinically in Kintyre but she has not yet been submitted to detailed study. The 10th (IV.10) is the younger brother of IV.9 (case 5 of Hutchison and McGirr 1954) and was first seen at the age of 4 weeks as a goitrous infant without signs of hypothyroidism. Such signs have recently appeared at the age of 2 years. The result of ^{131}I studies on this child suggests that the goitrous cretinism in this family is due to a deficiency of the enzyme dehalogenase (McGirr and Hutchison 1956).

There have also been 4 cases of Werdnig-Hoffmann paralysis (IV.1–4) in another lot of siblings. 3 patients died after hospital investigations in Glasgow and Edinburgh had established the diagnosis beyond reasonable doubt. The 4th case (IV.4) has recently been diagnosed. None of the parents of the cretins or of the patients with Werdnig-Hoffmann paralysis showed any evidence of disease. We have personally seen all these parents. We have not, however, examined all the supposedly healthy siblings of the cretins.

Discussion

It is obvious from the high familial prevalence of sporadic goitrous cretinism noted by ourselves and others in the United Kingdom and in the United States that this form of hypothyroidism must be genetically determined. In none of the present cases was there anything to suggest iodine deficiency or the ingestion of goitrogenic substances. Endemic cretinism usually appears in the family of a mother who is goitrous from iodine deficiency, whereas in the present cases the parents were, without exception, healthy.

It is therefore most unlikely that the appearance of goitrous cretinism in the Y-McX family group is related directly to their common environment. On the other hand, the pedigree (see figure) satisfies three of the

criteria usually accepted as indicating simple recessive inheritance (Roberts 1940):

(1) The parents of the affected persons are normal to outward appearances.
(2) There is a striking familial prevalence: three of the four lots of siblings contain more than one affected child. The ratio of normal to affected persons (21 : 10) shows the usual excess over the 3 : 1 ratio which is typical of recessive inheritance because we have adequate information only about sets of siblings in whom at least one person is affected. A number of normals in unaffected sibships must be unknown to us.
(3) All the affected persons are the children of consanguineous marriages.

Other characteristic, but rarely encountered, criteria of autosomal recessive inheritance are as follows:

(4) Affected persons who marry normals will have only normal offspring in most instances.
(5) Affected persons who marry affected persons will have affected offspring only.

These last two criteria have not been satisfied in the present pedigree, but in view of the predilection for consanguineous mating it is not inconceivable that the thyroid treatment instituted by us may alter this position in time.

Though it may properly be claimed that simple recessive inheritance cannot be proved on the strength of a single pedigree, the occurrence of familial prevalence and consanguinity in the families of other similar cases which we have cited makes it extremely probable that the present cases were so determined. The appearance within the same pedigree of Werdnig-Hoffmann paralysis—a disease known to be inherited as a mendelian recessive (Gates 1946)—is interesting. Here also the first three criteria of recessive inheritance mentioned above are fulfilled.

We have alluded to the possibility that the gene producing goitrous cretinism in the Y-McX family may be operating elsewhere in Scotland. We have already recorded the appearance of 3 siblings with goitrous cretinism in another family (Hutchison and McGirr 1954). These also were tinkers. They were referred to us by Prof. J. L. Henderson, of Dundee. Careful inquiry by Professor Henderson failed to produce any evidence that they were related to the Y-McX cretins, but (like us) he met some resistance in taking a family history from these people. We have recently had the opportunity of applying radio-iodine tests to 2 more cretinous siblings with goitre, who were referred to us by the Renfrewshire local authority from a home for deprived children. They gave results which were identical with those found in our earlier cases. The parents of these 2 children were also itinerant tinkers but could not now be traced. In view of the unique and self-demarcated mode of life of tinkers, who tend to intermarry and to live a life apart from the rest of the community, it seems at least probable that the various cretinous siblings whom we have studied owe their condition to the same recessive gene occurring in the homozygous state.

Summary

The pedigree of a group of itinerant tinkers is presented. It is noteworthy for the remarkable frequency of consanguineous mating.

Within this family group there were 10 cases of goitrous cretinism and 4 cases of Werdnig-Hoffmann paralysis.

Goitrous cretinism and Werdnig-Hoffmann paralysis are each due to the effect of single but quite separate autosomal recessive genes.

We wish to thank Dr. Catherine A. Brown, executive school medical officer, Argyll County Council, for her great help in tracing the various members of the family group; and Professor Henderson for his efforts to find the connecting link between his cretinous tinkers and ours.

References at foot of next column

VASOPRESSIN TANNATE IN OIL AND THE URINE CONCENTRATION TEST

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THE maximal ability of the kidney to concentrate the urine is generally considered to be a good indication of renal function, but to approach this concentration, at least twenty-four hours' deprivation of fluid is necessary (Miles et al. 1954). Deprivation of fluid, however, is seldom strictly controlled and depends on the variable amounts of water in the food and on the vigilance of the nurses. For the patient the test is nearly always unpleasant and occasionally, if a severe negative fluid-balance develops, it may be hazardous. The patient's emotional reaction to being deprived of fluid may also cause the results to be quite misleading (Miles and de Wardener 1953). Furthermore, because of its unpleasantness and potential danger, the concentration test is nearly always performed on only one occasion, although its value would be much increased if it were repeated. This natural disinclination to repeat the test is probably its greatest disadvantage.

To avoid these disadvantages Miles et al. (1954) investigated the possibility of substituting an injection of vasopressin tannate in oil for a long period of fluid deprivation. The concentration of the urine after deprivation of fluid was compared in the same subjects with that obtained after the intramuscular injection of 5 units of vasopressin tannate in oil. In 10 subjects convalescing from non-renal diseases the concentration of the urine after deprivation of fluid was usually greater than after the injection of vasopressin; the discrepancy in 3 of them being substantial; in 9 subjects with renal disease there did not appear to be any difference between the two methods. It was considered from these few results that vasopressin tannate was unlikely to be a sufficiently reliable substitute for deprivation of fluid in testing the kidney's maximal ability to concentrate the urine. Since these findings were reported, however, the same experiment has been extended to 43 more subjects, of whom 17 were normal (Jones and de Wardener 1956) and 26 were patients, of whom 18 had renal disease and 8 were convalescent from non-renal disease. The collected results from all these 62 subjects are given below; they confirm that the concentration of urine after deprivation of fluid is greater than after the injection of vasopressin, but they also show that the difference is such that for

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clinical purposes, it seems justifiable to substitute vasopressin tannate in oil for a long period of deprivation of fluid.

Methods

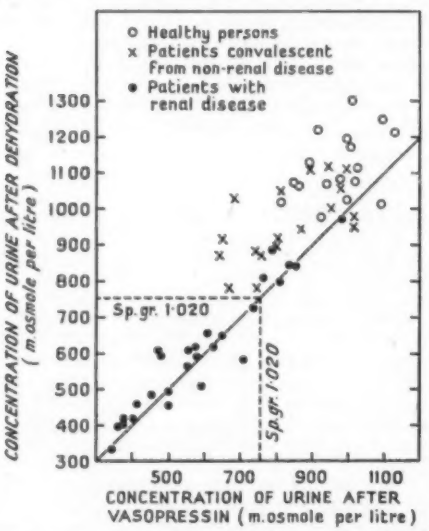
Deprivation of fluid was for thirty-six hours from 8 A.M., except the 17 healthy subjects, who were deprived of fluid for forty-eight hours from 8 P.M. During this time soups, ice-cream, and fruit were also withheld. The urine tested was that passed during the last eight hours of the period of deprivation—i.e., from noon to 8 P.M.

The effect of injecting vasopressin was observed one to two weeks after the fluid-deprivation test. Vasopressin tannate 5 units in oil was administered subcutaneously at 7 A.M., and the urine tested was that passed between noon and 8 P.M. on the same day. During this day all the subjects tested were allowed to eat and drink what they wished, but in addition the 17 healthy subjects were given 1000 ml. of water an hour after the injection of vasopressin for reasons already published (Jones and de Wardener 1956).

The osmolar concentration of the urine was calculated from the depression of its freezing-point. A mercury thermometer was used in the 19 original cases (Miles et al. 1954) and a thermistor in the remainder (de Wardener and del Greco 1955). The standard deviation of a reading with the thermistor is ±0·0102°C, corresponding to ±5·5 milli-osmole per litre.

Results

The results are illustrated in the accompanying figure, which shows the osmolarity of the urine after deprivation of fluid plotted against the osmolarity after an injection of vasopressin tannate in oil in 62 subjects. The scale of the abscissa is the same as that of the ordinate so that the line drawn at 45° to the abscissa represents the line along which the points would lie if the concentration of the urine after deprivation of fluid were the same as that after the injection of vasopressin. It can be seen, however, that the results have a linear relationship which lies slightly above this line, indicating that the concentration of the urine following deprivation of fluid is greater than after the injection of vasopressin. It is also evident that this difference becomes less as the osmolarity of the urine approaches that of plasma (about 300 milli-osmole per litre).



Osmolarity of urine after 36–48 hours' deprivation of fluid compared with that following injection of vasopressin tannate in oil in 62 persons: diagonal line shows where points would lie if deprivation of fluid and vasopressin tannate concentrated urine equally.

Discussion

The concentration of the urine is greater after fluid deprivation than following an injection of vasopressin tannate in oil, but this difference only amounts, in terms of specific gravity, to approximately 0·002 at a specific gravity of 1·022, and becomes less at lower urine concentrations. (The correlation between specific gravity and osmolarity of the urine has been obtained from the data of Miles et al. [1954].) It therefore seems justifiable, in testing the kidney's ability to concentrate the urine maximally, to substitute an injection of vasopressin tannate in oil for a long period of deprivation of fluid.

The reproducibility of this method is satisfactory. When vasopressin was given on three occasions to each of 9 healthy persons, the standard deviation of an estimate of the greatest concentration of the urine was 82 milli-osmole per litre (in urine 33 milli-osmole per litre is approximately equivalent to sp. gr. 0·001). Comparable figures for repeated deprivation of fluid were available in only 3 healthy persons each of whom was tested on two occasions, so that a proper comparison is impossible; it can only be stated that the greatest difference found in any one person was 46 milli-osmole per litre.

In the observations reported here the urine had to be collected at controlled intervals so that the comparison between the two techniques should not be confused by diurnal changes; but, since the effect of 5 units of vasopressin tannate in oil on the concentration of the urine continues for at least twenty-four hours, there is no need to do this for routine purposes. It is only necessary to measure the specific gravity of all samples of urine passed during the twenty-four hours following the injection of vasopressin tannate.

The one serious disadvantage of the use of vasopressin tannate in oil is that the vasopressin tannate is in suspension. When it has been standing the vasopressin collects as an insignificant brown discoloration at the bottom of the ampoule, and it is necessary to warm and shake the ampoule vigorously before use. It is also an advantage to use a large-bore needle to transfer the oil and vasopressin from the ampoule to the syringe.

There have been no complications following the administration of vasopressin tannate in oil except a feeling of torpor in the 17 healthy persons, who were also given 1000 ml. of water. This symptom did not develop in patients who drank only what and when they wished. Finally, freedom from side-effects and the greater convenience of the test when done with vasopressin allow the test to be repeated fairly frequently (weekly), thus greatly increasing its value.

Summary

The concentration of urine after deprivation of fluid has been compared with that following an injection of vasopressin tannate in oil in 17 healthy subjects, 18 patients convalescent from non-renal disease, and 27 patients with renal disease.

The concentration of the urine after deprivation of fluid was slightly greater than after the injection of vasopressin. This difference was least noticeable when the specific gravity of the urine was less than 1·020.

It is suggested that when an estimate of the kidney's maximal ability to concentrate urine is required for clinical purposes, an injection of vasopressin tannate in oil can be justifiably substituted for a long period of fluid deprivation.

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BACTEROIDES IN INTRA-ABDOMINAL SEPSIS

THEIR SENSITIVITY TO ANTIBIOTICS

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MOST cases of localised and generalised peritonitis are caused by organisms from the intestine. The organisms usually incriminated in surgical textbooks are *Escherichia coli* and other members of the coliform group and aerobic streptococci. Anaerobic streptococci and clostridia are sometimes mentioned, but the anaerobic non-sporing bacilli of the Bacteroides group are usually ignored.

The pioneer work of identifying these organisms was done by Continental bacteriologists:

Loeffler (1884) observed *Bacteroides funduliformis* (*Bacillus necrophorus*) in calf diphtheria.

Veillon and Zuber (1898) found them in appendicitis, and Hallé (1898) in diseases of the female genital tract.

Vincent (1896) found a fusiform bacillus of the same group in ulcerative lesions of the throat.

Similar organisms were subsequently demonstrated in normal mouths (Tunnicliff 1906, Slanetz and Rettger 1933) and in the healthy alimentary canal (Eggerth and Gagnon 1933, Weiss and Rettger 1937).

Bacteroides are the predominant organisms in the lower intestine, where they greatly outnumber *Esch. coli*.

For some time after the early work on Bacteroides their rôle in the causation of human infections was largely neglected for several reasons: the comparatively slow growth and the delicacy of Bacteroides compared with the other bacteria which often accompany them in pus and may overgrow them in cultures; the frequent omission of anaerobic methods from routine bacteriology; and, perhaps, the failure to ensure an adequate carbon-dioxide tension in anaerobic apparatus. A deficiency of carbon dioxide may inhibit the growth of some strains (Lewis et al. 1940).

More recently the importance of Bacteroides infections in many parts of the body has come to be more widely recognised:

Weinberg et al. (1928) found anaerobic gram-negative rods, accompanied by many other organisms, in acute appendicitis. Schmitz (1930) also found them numerous in appendicitis.

Harris and Brown (1927) found Bacteroides in 6 patients with postpartum infections.

Thompson and Beaver (1932) reported 2 cases of fatal bacteræmia and noted 10 others in the literature.

Cohen (1932) isolated several species of Bacteroides from 16 lung abscesses.

Lemierre (1936) described cases of Bacteroides septicæmia in which the infections spread from lesions of the mouth and jaw, the endometrium, the appendix, and other sites.

Dixon and Deuterman (1937) reported 6 postoperative abdominal infections.

Beigelman and Rantz (1949) reviewed 47 infections, in 34 of which the Bacteroides were associated with other organisms.

McVay and Sprunt (1952) observed 35 cases in five years; the infections involved the respiratory system, the gastro-intestinal tract, the female genital and urinary tracts, and the skin.

Clark and Wiersma (1952) and Carter et al. (1953) reported infections originating in the female genital tract in 47 and 153 patients respectively.

Alston (1955) reviews this subject and describes 12 cases due to *Bacteroides necrophorus*.

There have not been many reports of the sensitivity of Bacteroides to antibiotics:

Foley (1947) and Beigelman and Rantz (1949) found that Bacteroides were often resistant to penicillin and streptomycin.

McVay and Sprunt (1952) tested a few strains with penicillin, streptomycin, sulphadiazine, and aureomycin and found aureomycin to be much the most effective.

Fisher and McKusick (1953) found that strains varied greatly in sensitivity to penicillin and streptomycin, but most were highly resistant; all six strains tested with chloramphenicol and all seven with aureomycin were sensitive.

Garrod (1955) describes the results of a thorough investigation of the sensitivity of four species of Bacteroides (55 strains in all) to seven antibiotics. He found that all four were relatively resistant to streptomycin and sensitive to chloramphenicol and oxytetracycline. Three of the four species were sensitive to penicillin.

We report here a study of the bacteriology of intra-abdominal sepsis. Our objects were to find how often Bacteroides were present compared with other organisms, and to determine the sensitivity of Bacteroides to antibiotics and sulphonamide. We regarded all gram-negative anaerobic non-sporing bacilli as Bacteroides, although this definition covers a heterogeneous group of organisms.

Material and Methods

Most of the organisms were isolated from pus, from suppurative lesions in the abdomen, sent to the laboratory for routine examination in the year from Sept. 30, 1954, to Sept. 29, 1955. There were 34 specimens from either localised or generalised peritonitis caused by appendicitis, 18 specimens from peritonitis of other causes, and 46 swabs from discharging wounds of the abdominal wall. These 46 were selected for anaerobic study from 156 abdominal-wound swabs because the clinical features of the cases or study of the direct smears indicated the probability of anaerobic infection. In several of these wounds the pus was forming inside the abdomen and discharging through a drainage tube or a fistula, but in a few the infection was in the abdominal wall. In addition, 13 acutely inflamed appendices were obtained from the operating-theatre as soon as possible after operation and were studied in more detail than was possible with specimens sent to the laboratory for routine examination.

Smears and cultures were made from pus and from the peritoneal surfaces and walls of the appendices, care being taken to avoid contamination from their lumina. Careful microscopy of gram-stained smears was found to be important. Bacteroides were often clearly distinguishable from coliform bacilli, being more slender and shorter or, less often, filamentous or fusiform. Aerobic cultures were made on MacConkey agar and on 5% horse-blood infusion agar plates. Anaerobic cultures were made on blood-agar and were incubated in an atmosphere of hydrogen containing 5% carbon dioxide in McIntosh and Fildes (1916) jars. All the cultures were examined after one day's and two days' incubation at 37°C, and many of the anaerobic plates were incubated longer. Organisms which grew only on the anaerobic plates were retested for anaerobiosis by subculturing them on aerobic and anaerobic blood-agar. One or more subcultures were often required to separate the Bacteroides from the anaerobic cocci and other organisms accompanying them. Strains were preserved for future examination by freeze-drying with an Edwards' centrifugal freeze-dryer suspensions made in horse serum.

Sensitivity of Bacteroides to Antibiotics and Sulphonamide

Sensitivity tests were put up on anaerobic blood-agar plates with penicillin, streptomycin, chloramphenicol, oxytetracycline, chlortetracycline, tetracycline, erythromycin, bacitracin, neomycin, and polymyxin B. For most of the tests a disc method was used (Fairbrother and Martyn 1951, Fairbrother and Jennings 1955). The sensitivity of a smaller number of strains was measured more exactly by a quantitative method in which doubling dilutions of the drugs were incorporated in the plates; the lowest concentration which much reduced the growth of the organisms after forty-eight hours' incubation was taken as the lowest inhibiting concentration. As a control the Oxford staphylococcus, grown anaerobically, was included in each batch of strains tested with all the drugs

except polymyxin B, for which the control organism was a laboratory strain of *Esch. coli*. Sensitivity to bacitracin, neomycin, tetracycline, and chlortetracycline was determined by the disc method only, and sensitivity to polymyxin B by the quantitative method only.

To measure the inhibiting effect of strict anaerobiosis on the activity of streptomycin, the sensitivity of the Oxford staphylococcus was determined under aerobic and anaerobic conditions simultaneously. The effect of added carbon dioxide on the streptomycin (by lowering the pH) was examined by determining simultaneously the sensitivity of four cultures of Bacteroides in pure hydrogen and in hydrogen+5% carbon dioxide. For this comparison strains were selected which grew as well in hydrogen as in the mixture of hydrogen and carbon dioxide.

Sensitivity to sulphadiazine was determined by the method of Harper and Cawston (1945), usually with 10 mg. of sulphadiazine per 100 ml. During the earlier part of the work tests were done with 50 mg. of sulphadiazine per 100 ml., but several strains gave identical results when retested with 10 mg. of sulphadiazine per 100 ml.

TABLE I—FREQUENCY OF ISOLATION OF VARIOUS BACTERIA FROM ABDOMINAL SUPPURATIVE LESIONS

—	Acute appendicitis (special series)	Peritonitis and abscess caused by appendicitis	Other intraperitoneal sepsis	Abdominal wound discharges*	Total
No. of specimens	13	34	18	46	111
Coliform bacilli	12	25	8	21	66
Other aerobic gram-negative bacilli	0	3	3	9	15
Aerobic streptococci	7	12	4	17	40
Staph. aureus	0	0	2	8	10
Micrococci and *Staph. albus*	1	4	2	3	10
Other aerobes	1	0	0	4	5
Bacteroides	11	16	9	31	67
Anaerobic streptococci	10	10	5	18	43
Clostridia	2	1	2	2	7

*Selected for anaerobic incubation (see text).

Results

The organisms most commonly identified in the 111 specimens examined were Bacteroides in 67 specimens, coliforms in 66, anaerobic streptococci in 43, and aerobic streptococci in 40 (table I). The cultures of exudates on the surfaces of inflamed appendices yielded relatively more anaerobic streptococci and Bacteroides than did the cultures of peritoneal pus. This difference probably reflects the greater care with which cultures from the appendices were studied. The cultures were nearly always mixed, but in many specimens Bacteroides were the predominating organisms and often they were numerous. Pure growths of a coliform were obtained from 3 specimens, of *Staphylococcus aureus* from 3, of *Staph. albus* from 1, and of Bacteroides from 1 specimen only. Clostridia were usually scanty compared with the other organisms present; they were noted in moderate or large numbers in only 7 specimens, but probably were sometimes overlooked when greatly outnumbered by other bacteria.

The Bacteroides strains usually grew quite easily and after forty-eight hours' incubation gave colonies 0·5–1·0 mm. in diameter or sometimes larger. The colonies were smooth, easily emulsifiable, usually greyish and semi-translucent, and with a low convex surface and an entire edge, and produced no obvious hæmolysis. Many closely resembled the colonies of the anaerobic streptococci which often accompanied them. The growth of many Bacteroides was encouraged by carbon dioxide in the anaerobic atmosphere. Eight strains were cultured simultaneously on blood-agar in hydrogen and in hydrogen+5% carbon dioxide. All grew well in the mixture, whereas in the hydrogen 3 grew feebly, 3 grew moderately well, and 2 gave colonies as large as those grown in hydrogen+carbon dioxide.

TABLE II—SENSITIVITY OF BACTEROIDES TO ANTIBIOTICS AND SULPHADIAZINE TESTED BY THE DISC AND HARPER-CAWSTON METHODS RESPECTIVELY

Antibiotic	No. of strains tested	Sensitive	Moderately sensitive or doubtful	Resistant
Penicillin	57	2	3	52
Streptomycin	57	1	2	54
Chloramphenicol	57	54	3	0
Oxytetracycline	57	54	3	0
Chlortetracycline	23	22	1	0
Tetracycline	17	16	1	0
Erythromycin	54	30	17	7
Bacitracin	17	0	2	15
Neomycin*	11	0	0	11
Sulphadiazine	38	32	0	6

*Each neomycin disc contained 30 μg.

Bacteroides probably were present even more often than appears from our results. On several occasions we failed to isolate them although we suspected their presence from microscopy of the pus. This may have happened when they were present in relatively small numbers and were therefore easily overgrown in mixed cultures, or when we were dealing with the more delicate and slowly growing varieties, or with strains which may have been destroyed by overlong exposure to the air during examination of the plates (Hine and Berry 1937). Even small numbers of *Esch. coli* are readily detected in culture, but Bacteroides—even those of comparatively easy growth—must be fairly numerous if they are to be detected in the complicated mixed cultures usually obtained from abdominal pus.

The results of the sensitivity tests are given in tables II and III. The two methods agreed well. All the strains tested were sensitive to the tetracyclines and chloramphenicol. Most of them were sensitive to sulphadiazine, and more than half were fully or moderately sensitive to erythromycin. Most were resistant to penicillin and to streptomycin. Their resistance to strepto-

TABLE III—QUANTITATIVE SENSITIVITY TESTS: LOWEST INHIBITING CONCENTRATION OF ANTIBIOTICS FOR BACTEROIDES AND CONTROL ORGANISMS GROWING ON ANAEROBIC BLOOD-AGAR

Antibiotic	Bacteroides	Control organism
Penicillin	1 strain 0·075 unit per ml. 1 ,, 0·15 ,, ,, 1 ,, 0·6 ,, ,, 1 ,, 5·0 units ,, 7 strains 10·0 ,, ,, 2 ,, 20·0 ,, ,,	Oxford staphylococcus 0·03 unit per ml.
Streptomycin	2 strains 31·2 μg. per ml. 1 strain 62·5 ,, ,, 3 strains 125 ,, ,, 10 ,, 250 ,, ,, 5 ,, 500 ,, ,, and over	Oxford staphylococcus 31·2 μg. per ml. (Oxford staphylococcus aerobic 1·9 μg. per ml.)
Chloramphenicol	1 strain 1·5 μg. per ml. 9 strains 3·1 ,, ,,	Oxford staphylococcus 3·1 μg. per ml.
Oxytetracycline	2 strains 0·15 μg. per ml. 13 ,, 0·3 ,, ,, 1 strain 1·2 ,, ,,	Oxford staphylococcus 0·15 μg. per ml.
Erythromycin	2 strains 0·06 μg. per ml. 1 strain 0·12 ,, ,, 2 strains 0·25 ,, ,, 3 ,, 0·5 ,, ,, 1 strain 1·0 ,, ,, 1 ,, 4·0 ,, ,,	Oxford staphylococcus 0·06 μg. per ml.
Polymyxin B	3 strains 250 units per ml. 20 ,, 500 ,, ,, and over	*Esch. coli* 1 unit per ml.

mycin was usually much greater than that of the Oxford staphylococcus, although streptomycin was less effective against this organism under anaerobic than under aerobic conditions (table III). The use of pure hydrogen in the anaerobic jar made no appreciable difference to the streptomycin sensitivity of the strains whose growth was not affected by the omission of carbon dioxide.

All the strains tested with bacitracin, neomycin, and polymyxin B were resistant to these substances.

Penicillin and streptomycin are often given simultaneously in the treatment of peritonitis. We tried to determine whether these drugs could enhance one another's action to a degree which would make them clinically effective in Bacteroides infections. Ten strains of Bacteroides were plated on blood-agar containing various concentrations of penicillin and streptomycin. The presence of a subinhibitory concentration of either drug did not increase the sensitivity to the other more than twofold.

During the investigation organisms apparently similar to the intra-abdominal Bacteroides strains were isolated from other sites on 41 occasions. Twenty-three strains were isolated from postpartum high vaginal swabs. Other sources included 1 salpingitis, 1 empyema, 1 Bartholin abscess, and 1 abscess of scrotum. Most of the vaginal strains appeared to be behaving as commensals.

It is not easy to determine the clinical effect of an antibiotic on Bacteroides strains in patients with intra-abdominal sepsis, because other organisms are usually present and successive samples of pus are often difficult to obtain. The following case did provide evidence of the effectiveness of oxytetracycline :

A man, aged 56, was operated on for pelvic appendicitis in August, 1955. An abscess was found lying against the lateral pelvic wall. The remains of a partially destroyed appendix were removed with considerable difficulty. In view of the extensive induration and of the possibility of an escaped stercolith having been left behind, it was felt that a residual abscess might form. The patient was readmitted to hospital in October with a purulent discharge from the wound and complaining of severe low back pain, thought to be probably due to a residual abscess. He was treated with penicillin and streptomycin and left hospital after five weeks. He was readmitted on Nov. 21, 1955, with severe low back pain and a temperature of 101°F. A large abscess pointing in the right loin just above the iliac crest was opened next day and found to be tracking up from the pelvis. A drainage tube was inserted, through which there was a copious discharge of pus each day until antibiotic treatment was started. On Nov. 24 and 26 the pus was examined ; smears showed many slender gram-negative bacilli and a very few streptococci, and cultures yielded a few aerobic micrococci and profuse growths of Bacteroides resistant to penicillin and streptomycin and sensitive to oxytetracycline, chloramphenicol, and erythromycin. The patient was given oxytetracycline 2 g. by mouth on Nov. 26, followed by 1 g. daily. On Nov. 28 the discharge had diminished ; a smear showed very few gram-negative bacilli, and culture yielded a scanty growth of Bacteroides. The same result was obtained each day until Dec. 3, when oxytetracycline 3 g. was given, followed by 2 g. daily. Thereafter the Bacteroides disappeared from the smears, and daily cultures were sterile. The amount of discharge decreased each day and ceased on Dec. 7, when the patient left hospital. He continued to take oxytetracycline until Dec. 11, and has kept well since.

Discussion

Mixed infections are the rule in intra-abdominal sepsis, and it is difficult to assess the virulence of the different organisms. This difficulty applies as much to *Esch. coli* (which is commonly regarded as a pathogen) as to other organisms. In the absence of better criteria of virulence it must be assumed that varieties of bacteria which are commonly numerous are of pathogenic importance. On this basis the most important bacteria are *Esch. coli*, aerobic and anaerobic streptococci, and Bacteroides. The Bacteroides are probably the most numerous of all.

The treatment of intra-abdominal sepsis is, of course, primarily surgical, and antibiotics are by no means always required. When they are, they usually must be given promptly, and the initial choice of drug must often be based on a knowledge of the bacteria usually present in similar infections.

It would be wrong to dogmatise about the antibiotic treatment of a condition whose bacterial causation is as complex and variable as peritonitis. Penicillin and streptomycin are often given simultaneously to control infection by gram-positive organisms and by coliform bacilli, and many surgeons believe that they are beneficial. Several workers have found the tetracyclines to be effective adjuncts to the surgical treatment of peritonitis, and some (Wright et al. 1949, 1951, Wright and Prigot 1951, Prigot and Maynard 1955) consider that they are better than the older drugs. Cantrell and Stafford (1955) found that subphrenic and other intra-abdominal abscesses followed appendicitis less often since the introduction of broad-spectrum antibiotics. Our sensitivity tests showed the tetracyclines to be highly active against Bacteroides ; they are also active against most coliform bacilli, streptococci, and clostridia. The tetracyclines are therefore probably superior to penicillin and streptomycin, which are unlikely to influence abdominal infections in which Bacteroides are the main agents. This conclusion is strengthened by the published reports of Bacteroides infections of various organs cured with tetracyclines (Rantz 1951, Marson and Meynall 1953). Garrod (1955) also suggests that a tetracycline should be used for infections originating in the lower bowel. The tetracyclines, like other antibiotics, cannot be used without some risks ; therefore they should not be used in conditions in which antibiotics are not clearly needed—e.g., uncomplicated appendicitis.

Those who prefer to use penicillin and streptomycin in peritonitis should be prepared to substitute a tetracycline if these drugs prove ineffective. In particularly severe infections it may be advisable to give streptomycin with the tetracycline, to ensure a more rapid bactericidal action on coliform bacilli. Stern and Elek (1955) found that a mixture of streptomycin and a tetracycline had a bactericidal action on coliform bacilli and suppressed resistant variants.

It should be remembered that our sensitivity tests were done with strains of intestinal origin. Garrod (1955) shows that other strains may be different, especially in their sensitivity to penicillin.

Summary

In 111 specimens of pus from the abdomen organisms of the Bacteroides group were often present in large numbers. Other organisms which were often numerous were *Esch. coli*, aerobic streptococci, and anaerobic streptococci.

Most of the Bacteroides strains were resistant to penicillin, streptomycin, bacitracin, neomycin, and polymyxin B. All were sensitive to tetracyclines and to chloramphenicol. Most were sensitive to sulphonamide and moderately or fully sensitive to erythromycin.

We wish to thank Mr. R. V. Cooke for permission to publish the case-report, and Mr. L. J. Waller for valuable technical assistance.

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A NEW POSTOPERATIVE DENTAL DRESSING

DEQUADIN CHLORIDE IN GELATIN SPONGE

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To obtain and encourage uneventful healing following oral surgery, including dental extractions, is the aim of every practitioner. Owing to the remarkable power of recovery of the oral tissues, unpleasant sequelæ are rare; and of these, septic sockets and hæmorrhage are the chief offenders. They are sufficiently inconvenient, nevertheless, to call for preventive measures to reduce or eliminate their occurrence, and for special treatment should they arise. Septic sockets embarrass both the patient and the operator. The pain and debilitation suffered by the patient with a dry socket is profound indeed; and nobody can appreciate this unless they have had one themselves.

Hæmorrhage after a dental operation may be (*a*) immediate or primary (at the time of the operation), (*b*) secondary (usually within twenty-four hours), or (*c*) recurrent (several days after the operation). There are various ways of treating these hæmorrhages, and one successful method has been in the insertion of gelatin-sponge preparations incorporating an antibiotic and thrombin. Suturing the wound and other methods may be combined with this treatment.

Thoma (1945) believes that three factors are necessary for straightforward postoperative healing:

(1) A bactericidal and bacteriostatic agent is needed because absolute asepsis is difficult to achieve and maintain during the operation.

(2) A local hæmostatic agent is desirable, because secondary hæmorrhage, although generally slight, is common during the first twenty-four hours and sometimes occurs after the hæmostatic effect of the local anæsthesia has subsided.

(3) To prevent the breakdown of too large a blood-clot, thus furnishing an excellent medium for bacterial growth, a way to eliminate space must be found.

Sutton (1948) states that an agent, or combination of agents, used for this purpose should have the following properties:

(1) *Absorption.*—For immediate closure of a wound, it is essential that anything placed in it is completely absorbed.

(2) *Hæmostasis.*—To prevent oozing or slight bleeding, the material itself must be hæmostatic or allow incorporation of a suitable hæmostatic agent.

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(3) *Bacteriostasis.*—The material should either have bacteriostatic properties itself or be a suitable vehicle for a variety of antibiotics.

(4) *Non-antigenicity.*—The material must not induce sensitivity or carry the risk of an anaphylactic reaction.

(5) *Clot-support.*—The material must help to maintain the structure of the blood-clot and at the same time it must not interfere with normal repair.

(6) *Non-irritability.*—It must not cause mechanical or chemical irritation.

(7) *Sterilisability.*—The material when used must be sterile, and ease of sterilisation is important.

(8) *Ease of use.*—It must be simple to handle and insert.

(9) *Availability.*—The supply must be assured at a reasonable cost.

Materials Previously Tried

Several such materials have been developed and investigated in recent years, including alginates, oxidised cellulose, fibrin foam, and gelatin sponge. Gelatin sponge seems to conform most closely to the ideal substance. In the past, gelatin sponge has been used almost entirely in the prevention and control of post-operative hæmorrhage and for eliminating the "dead space" in large closed oral wounds. It has also been used for socket implantation after extractions. In the closed wounds, the gelatin sponge seemed effective and was absorbed without putrefaction. In open wounds it often became foul and healing was impaired—probably because it acted as a culture medium. Unpleasant sequelæ have also been reported by Jenkins (1946), Taylor and Kaplan (1950), and Moore et al. (1954).

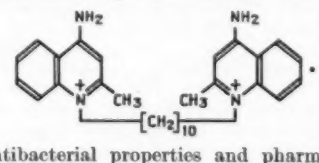
Sponge soaked in penicillin reduced the sequelæ to some extent, but views differ about how much penicillin to use (Fleming and Fish 1947, Silverman 1949) and there is always the danger of sensitisation and the production of resistant organisms. Other disadvantages were that some bacteria were already penicillin-resistant, penicillin is inactivated by serum, and the technique is time-consuming. Whether the penicillin remains active in the tooth socket for long enough to achieve any worthwhile bacteriostasis is also debatable; the findings of Holland and Tain (1954) suggest that it does not.

It seemed that a more effective bacteriostatic or bactericidal agent must be found and incorporated; for Silverman (1949), using the sponge alone, noted that there was no variation in incidence of postoperative pain, compared with untreated sockets. Results in the extraction clinic (local anæsthesia) at King's College Hospital agree with this finding.

A New Combination

After unsatisfactory trials, using various materials, had been carried out in the dental department of this hospital, a new combination was evolved. This consisted of gelatin sponge impregnated with 0·1% 'Dequadin chloride.'

During the development of laudexium ('Laudolissin'), a synthetic muscle relaxant of the true curarising type, it was observed that solutions of the drug had considerable antibacterial activity. Many simpler related compounds were therefore synthesised and tested for antibacterial properties. The compound selected for clinical trial was decamethylene-bis-(4-aminoquinaldinium chloride) (dequadin chloride). Its formula is:



Its antibacterial properties and pharmacology have been investigated by Babbs et al. (1956). Its salts inhibited the growth of all microbial species used in

laboratory investigations, including gram-positive, gram-negative, and acid-fast bacteria, and fungi including *Candida albicans*. Unlike many other quaternary ammonium salts, it was not inactivated by serum.

Gelatin sponge impregnated with dequadin chloride was used in two ways: (*a*) when the dental surgeon judged that postoperative sequelæ were likely, it was used prophylactically; and (*b*) when postoperative complications were present, it was used as treatment.

It was used prophylactically in over 900 cases in which extractions were performed under local anæsthesia. In many of these more than one tooth socket was so treated. Pieces of gelatin sponge were inserted into the wound immediately after extraction, before a covering pack was placed over the wound (a normal routine procedure). The sponge was lightly inserted, care being taken not to consolidate it before putting it in or to pack it tightly into the socket. If the sponge was consolidated, the results were less satisfactory. The wound was sutured when necessary: in these cases it was easier to place the sponge in the wound after inserting the sutures but before tying them, because the sponge tended to be squeezed out of the wound during suturing.

In approximately 97% of the cases healing proceeded normally, and in many of these hæmorrhage or dry sockets would, judging from the history and the conditions at operation, have almost certainly ensued without the prophylactic use of the dequadin-chloride sponge. There was no postoperative hæmorrhage in any of the prophylactically treated cases. Although a few septic sockets developed despite prophylactic treatment, most of these involved either lower impacted or buried third molars or sockets where excessive extraction manipulation had previously occurred.

When a dry socket resulted it was treated with the dequadin sponge, upon which was deposited a few drops of a sedative such as 'Dentalone.' The patient was told to report back if pain and lack of healing persisted. In almost all of the cases treated a further visit was unnecessary. If they did return the dequadin sponge plus dentalone dressing was repeated when there was pain present; the dequadin sponge alone was used if the pain had subsided.

Many varied treatments for dry sockets have been tried in this department, but this technique has been the most satisfactory so far.

Patients who had had difficulties after previous dental extractions reported good healing with the prophylactic therapy.

Hæmorrhage from sockets not treated prophylactically was treated with dequadin impregnated sponge: sutures were sometimes used. No septic socket followed this treatment, as has happened previously when ordinary gelatin sponge or oxidised cellulose gauze had been used; and no swelling supervened, though this was a common event with sockets treated with cellulose gauze.

Conclusion

Dequadin chloride, a potent, non-toxic, and non-irritant antiseptic, appeared to supplement the gelatin-sponge therapy by preventing and counteracting infection in the wound, by preventing putrefaction of the sponge, and by encouraging healing. Compared with the results of previous investigations of postoperative complications, there seemed to be a reduction in the incidence of such sequelæ when the dequadin-chloride sponge was used. No definite conclusion can be drawn because of the unknown variables, but our observations suggest that it is a valuable treatment. The incorporation of dequadin chloride into gelatin sponge may have a wider application in general surgery and medical practice.

My thanks are due to Dr. R. Cocker, director of dental studies, for permitting this investigation; to my assistants, Mr. P. Belsham, Mr. G. Hawkes, Mr. L. Shinn, Mr. T. Farrell, and Mr. W. Johnson; and to the medical and research departments of Messrs. Allen & Hanburys for their coöperation in producing and supplying the experimental dequadin-chloride sponge.

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DIFFUSE INFILTRATION OF THE LUNGS ASSOCIATED WITH CRYPTOCOCCUS LUTEOLUS

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THE number of published reports of cryptococcosis is relatively large. Collins et al. (1951) reviewed 241 cases, and Cohen and Kaufmann (1952) 220. In each of the published cases *Cryptococcus neoformans* was the pathogenic agent. On invading the body this yeast usually attacks the brain and meninges, causing subacute or chronic, but almost invariably fatal, disease. The lungs have been suggested as the most likely portal of entry, but Hirsch and Coleman (1929) assumed that, when the meninges were affected, the yeast invaded them via the nasopharynx. The central nervous system has been estimated to be involved in a third of the cases of pulmonary cryptococcosis by Langeron and Vanbreuseghem (1952) and in 42% by Swartz (1949).

Primary pulmonary cryptococcosis that remains localised to the lungs is rare. Linden and Steffen (1954) knew only 9 cases, including 1 of their own. Since then single cases have been reported from Belgium (Van Goidsenhoven et al. 1954), Canada (Eisen et al. 1955), and Hungary (Vitéz et al. 1955). Only 4 of the cases so far published were of the disseminated nodular type.

Cox and Tolhurst (1946) are of the opinion that primary pulmonary cryptococcosis is more common than one would expect on the basis of reported incidence. These workers believe that cryptococcosis often escapes detection owing to spontaneous recovery and to lack of spread, and of signs and symptoms. Beck et al. (1955) agree with this view.

In the case reported here the infecting yeast was *C. luteolus*, which is closely related to *C. neoformans*.

Case-report

A girl, aged 4½ years, was admitted to this hospital with the diagnosis of recent measles, present whooping-cough, and suspected submiliary tuberculosis of the lungs. She had begun to cough sixteen days earlier and had had an exanthem suggesting measles eight days before admission. Four days before admission she had pyrexia (102·2°F) and was given four injections of penicillin for supposed pneumonia. Case-notes which accompanied her from another hospital said that auscultation had revealed diffuse crepitations, areas of bronchial breathing, and râles in the lungs. The liver had been enlarged, its lower margin being palpable 4 cm. below the right costal arch. No other physical changes had been detected.

There was said to be an increased amount of urobilinogen in her urine, and a blood-count had shown red cells 5,160,000 per c.mm., Hb 80%, and white cells 51,000 per c.mm. (polymorphs 31%, lymphocytes 61%). Radiography of the chest had revealed in both lungs numerous disseminated soft nodular shadows and distension of hilar shadows with bundle formation suggesting tuberculosis. A Pirquet test and a Mantoux test in a dilution of 1 : 1000 had been negative. Lumbar puncture had produced clear cerebrospinal fluid (C.S.F.) under increased pressure and containing no cells. Pándy and Waltner tests had been negative.

On admission to our hospital the patient was moderately developed and thin, weighing 12·6 kg. She had cyanosed lips and nails. On her skin a few pigmented spots were visible like those of measles. No abnormality was found on percussion of the chest, but on auscultation extensive diffuse metallic moist râles were heard over the lungs. The pulse-rate was 120, with the pulse rhythmic, equal, and easily suppressible. The cough was typical of whooping-cough. No symptoms or signs suggesting involvement of the central nervous system were detectable.

Investigations.—A considerable amount of urobilinogen was present in the urine. A blood-count showed red cells 4,420,000 per c.mm. and white cells 20,000 per c.mm. (polymorphs 39%, lymphocytes 59%, plasma cells 2%). The erythrocyte-sedimentation rate (E.S.R.) was 16 mm. in the first hour (Westergren). A Mantoux test in a dilution of 1 : 1000 was negative.

Treatment and Course.—The child was given 'Threomycin' 4 g. in four days and penicillin 8,400,000 units and streptomycin 5·6 g. in fourteen days. Pyrexia disappeared in four days, but later her temperature rose again slightly. Coughing subsided, and she began to gain weight. Sixteen days after admission she again had pyrexia (104°F), and physical examination revealed insignificant changes in the lungs. The E.S.R. was 75 mm. in the first hour (Westergren). A blood-count showed red cells 4,360,000 per c.mm. and white cells 16,800 per c.mm. (metamyelocytes 4%, polymorphs 68%, eosinophils 2%, monocytes 3%, lymphocytes 23%). The urine was practically normal. Blood-culture remained sterile. Lumbar puncture produced clear C.S.F. under normal pressure and containing 10 cells per c.mm., protein 0·28 mg. per 100 ml., and sugar 63 mg. per 100 ml. A Pándy test showed slight opalescence. Nothing abnormal was found in the central nervous system. Radiography of the chest (fig. 1) revealed ill-defined round opacities of different sizes in both lungs, decreasing in number hilifugally; they had no definite outlines and were found mainly in the upper lobes. They were somewhat fewer at the apices and considerably fewer in the inferior lobes and near the diaphragm. The hilar shadows were of normal density and showed no extension. Both halves of the diaphragm had sharp outlines and moved freely. The heart was normal in shape, with a slight bulging of the pulmonary arc. The mediastinum was free. Since this radiographic pattern did not fit the picture of any known disease, especially

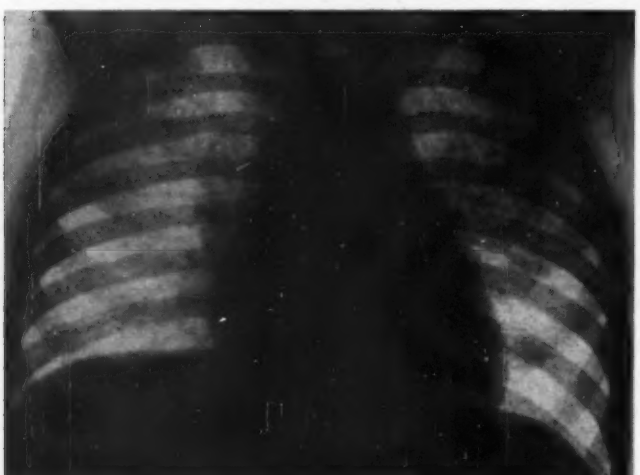

Fig. 1—Small nodular shadows of irregular shape, indefinite outline, and different sizes in both lungs.

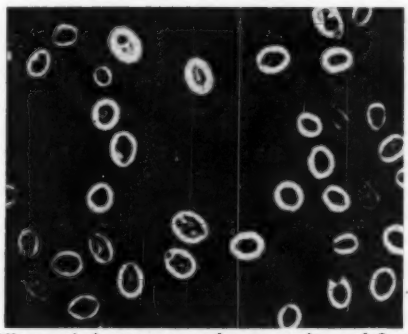

Fig. 2—Microscopical appearances of a pure culture of *Cryptococcus luteolus* in china-ink.

submiliary pulmonary tuberculosis, it was suggested that the changes might be due to mycosis. To exclude tuberculosis Mantoux tests were made on Nov. 2 and Dec. 28, 1954, and on Jan. 7, 1955. The results were all negative, although the dilution used was 1 in 100. Bronchial swabs obtained on laryngoscopy were sent to the mycological laboratory of the State Institute for Public Health on Oct. 12, Oct. 23, and Dec. 22, 1954. They were taken via a rubber tube introduced into a bronchus through a laryngoscope.

Mycological Studies.—Three samples of bronchial secretion taken in this way grew a yeast on media commonly used for this purpose (Sabouraud agar, malt-agar, blood-agar, and malt extract) and typing was according to Lodder and Kreger-Van Rij (1952). All three samples were centrifuged, and the sediment was mixed with china-ink and examined microscopically, yielding one ovoid or elongated, sometimes budding and encapsulated, organism to every two or three fields. From each sample a pure culture of a blastomyces was recovered. All three cultures were identical, and the yeast had the following main properties. On growth at 26°C for three days in malt extract elongated or oval, sometimes budding cells, about 4 $\mu \times 6$ μ, were detectable. Pseudomycelia and hyphæ were absent. A thin film was present on the surface of the fluid medium. The cells grown in malt extract at 26°C for thirty days were enclosed in a thick mucous capsule. Growth in Sabouraud agar at room-temperature or at 37°C for thirty days produced a highly lucent, yellowish-brown, definitely mucous colony at the bottom of the test-tube. After thirty days' growth in Gorodkowa and Adams agar at 26°C or at 37°C asci were not detectable by spore staining. In corn-meal agar no chlamidospores were formed. The organs assimilated glucose, galactose, maltose, and saccharose, but not lactose or potassium nitrate, and did not ferment carbohydrates. These characters identify the organism as *C. luteolus* (fig. 2).

Animal Inoculation.—10 mice were inoculated intracerebrally with a heavy suspension of the yeast in physiological saline solution. The mice had no signs during sixty days' observation. Then another 6 mice were inoculated in the same way, and these too were free from signs when killed sixteen days later. We failed to grow the yeast from the brains of these mice and attempts to detect it by direct examination failed. Histological examination yielded negative results. The intracerebral route of inoculation had been chosen in view of the fact that this method proved to be the most efficient for demonstrating the pathogenicity of the closely related *C. neoformans*. Experimental evidence was obtained that *C. luteolus* did not affect the central nervous system of the mouse. Since our patient had no nervous symptoms either, it has been suggested that this yeast may act specifically on the lung only. To elucidate this point, experiments on animals are being made in which the yeast is introduced directly into the lungs by intrathoracic injection and by aspiration.

Course of Patient's Illness—Until the final results of the mycological studies were available, the patient was given an additional 19,000,000 units of penicillin, 18 g. of streptomycin

and 7·6 g. of isoniazid. The pyrexia subsided by lysis, and the patient remained apyrexial for the rest of her stay in hospital except for a slight rise of temperature for a few days. She developed mild hepatitis on Oct. 9, but recovered from it uneventfully. Vitamins and tonics were given, and the patient was entirely free from symptoms. The changes in the lungs detected by radiography remained stationary for a long time and were not influenced by administration of 'Paraben' 3 g. given over three days. Later the radiographic appearances slowly changed, beginning in the less affected inferior lobes and spreading gradually to the upper lobes.

Discharge and Follow-up.—The child was discharged on Jan. 26, 1955, when she was completely free from symptoms, had no complaints whatever, and weighed 15·7 kg. She has since been examined at intervals of three to four weeks, and her E.S.R. and blood-counts are persistently normal. Radiography of her chest on June 28, 1955, showed practically no nodular shadows. In both hilar areas, around the upper pole, there were numerous thick bundles with a few small pale nodular shadows, with indefinite outlines, on the right side only. The lower pole of the hilar areas showed a few soft trabecular shadows running towards the diaphragm.

Discussion

Of the 9 cases of primary pulmonary cryptococcosis reviewed by Linden and Steffen (1954) 5 were diffuse pulmonary affections (2 the small nodular type) and 4 torulomas. The present case was a toruloma. Similar pulmonary changes have been described by Van Goidsenhoven et al. (1954) and Eisen et al. (1955). The present case resembles that published by Eisen et al. also in that the radiographic changes did not fit the pattern of any of the diseases that should be considered in the differential diagnosis. This fact pointed to mycosis, and the suspicion was borne out by cultural examinations in all 3 cases.

In assessing the radiographic changes in our patient's lung, residual changes due to preceding measles and whooping-cough had to be considered too. In the published cases mentioned and in our case there were, however, certain radiographic signs which were somewhat typical though not pathognomonic: hilar involvement was either absent or very slight; disseminated nodular lesions were present at the apices and near the diaphragm in very small numbers only or not at all; and the single nodular shadows varied in size and shape, and their outlines were less definite than those of tuberculous lesions. This agrees well with the histological findings of Hirsch and Coleman (1929) who found, in their patient with secondary pulmonary cryptococcosis associated with meningeal involvement, nodular pulmonary lesions whose outlines were irregular and less definite than those of the lesions of miliary tuberculosis. The nodular lesions in the present case were present in the upper lobes, which is also in accordance with what Hirsch and Coleman found.

It is the mycological evidence, however, that gives particular significance to the present case. In all the cases published so far the pathogenic agent was *C. neoformans*; but in the present case the yeast recovered from all three specimens of bronchial secretion obtained by direct suction was *C. luteolus*.

C. leuteolus was first isolated from air by Saito in 1922, in Tokyo, by the method of Lodder and Kreger-Van Rij. This yeast is extremely rare, and this is the first time that it has been found in Hungary. It is closely related to *C. neoformans*, the well-known pathogen causing cryptococcosis. The two species differ but slightly in morphology, inasmuch as on growth under identical conditions the *neoformans* cells are spherical and the *luteolus* cells ovoid or elongated. In view of the close relationship between these two species, Lodder and Kreger-Van Rij (1952) direct attention to a potential pathogenicity of *luteolus* and emphasise the importance of experiments on animals.

Although so far we have not been able to prove experimentally that this yeast can act as a pathogen, we can assume that it can do so in man, because in the present case no other pathogenic agent was detected by radiographic, clinical, or microbiological methods.

Summary

A case of diffuse pulmonary infiltration, associated with *C. luteolus*, in a girl aged 4½ years is described.

C. luteolus was recovered on three occasions from bronchial secretion obtained on laryngoscopy.

We have been unable to find any published report that *C. luteolus* is pathogenic to man. Its pathogenicity to animals also still awaits final corroboration.

C. luteolus is closely related to the well-known pathogen *C. neoformans*.

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CORTISONE THERAPY IN EARLY PREGNANCY: RELATION TO CLEFT PALATE

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WE report here the occurrence of a cleft palate in a baby whose mother received cortisone therapy in early pregnancy, and review the experimental evidence that cortisone treatment of laboratory animals in early pregnancy may lead to congenital cleft palate in the offspring.

Case-report

A woman, aged 30, with four years' history of idiopathic steatorrhœa was treated with a gluten-free diet, oral iron, and vitamins, but her condition remained unsatisfactory, and persistent diarrhœa and anæmia led to her third admission to hospital for trial cortisone therapy.

On admission on Nov. 9, 1954, she was pale and thin, and weighed only 6 st. 8 lb. Chvostek's sign positive. Œdema of legs. Abdominal and pelvic examination normal. Hæmoglobin 71% (Haldane) (10·5 g. per 100 ml.). Serum-calcium level 6·5 mg. per 100 ml. Plasma-protein level 5·2 g. per 100 ml. (albumin 2·9 g. per 100 ml., globulin 2·3 g. per 100 ml.). Fat-balance 80% absorption over 4 days.

Gynæcological and Obstetrical History.—Menarche at the age of 13. Normal menstrual loss lasting 5 days. Cycle predominantly 28 days, but periods of amenorrhœa lasting 2–3 months had occurred, notably after the previous admissions to hospital. Last menstrual period (Oct. 8–12) began 32 days before her admission. First pregnancy at the age of 24; threatened abortion in first trimester but otherwise uneventful, terminating in the spontaneous delivery of a full-term normal baby. At the age of 26, vaginal bleeding after 10 weeks' amenorrhœa, the cause of which was unknown, but pregnancy could not be excluded.

Family History.—No known congenital defects on either side of family.

Progress.—Treatment with oral cortisone 100 mg. t.d.s. and normal diet was begun on Nov. 29. In view of the menstrual history and the negative findings on examination no significance was attached to the 8 weeks' amenorrhœa. The patient's general condition improved, and the dose of cortisone was reduced (see fig. 1). On Jan. 3, 1955, she was discharged home on a maintenance dose of cortisone 12·5

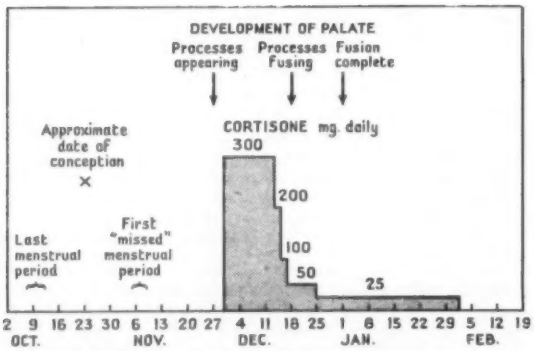

Fig. 1—Relation of cortisone treatment to pregnancy.

mg. b.d., the continuing amenorrhœa being attributed to cortisone therapy.

Follow-up.—When she attended as an outpatient on Feb. 2, her uterus was enlarged to a size equivalent to that of an 18-week pregnancy. Cortisone was discontinued, the total dose received being 6·05 g. The patient remained in good health, with a normal blood-pressure throughout the remainder of her pregnancy, the steatorrhœa improving both clinically and biochemically. On July 30, 2 weeks past the expected date of delivery, she was readmitted for medical induction of labour. This was unsuccessful, and since some doubt existed about the maturity of the fœtus she was discharged. On Aug. 11 she was readmitted in labour and delivered spontaneously of a fresh stillborn male baby. The placenta was relatively small and weighed 8 oz.—i.e., a thirteenth of the weight of the baby.

The baby appeared to be full-term on macroscopical and radiological examination. Weight 6 lb. 8 oz. No external abnormalities. The palate (fig. 2) had a large postalveolar cleft. The lungs were collapsed, and the trachea and main bronchi contained thick meconium-stained mucus. Several small hæmorrhages were present beneath the visceral pleura and epicardium. No further abnormalities were found, and the appearances suggested that death resulted from intra-uterine anoxia.

Experimental Evidence

Congenital malformations have received increasing attention during the past twenty years. This has led to the concept that the process of normal development is influenced by both genetic and environmental factors; but, since the effects of the latter may simulate those of the former, it is often impossible to distinguish between them. General reviews relating to this have been presented by Gruenwald (1947), Warkany (1947), Boyd and Hamilton (1950), and Giroud (1954).

Experimental evidence of the teratogenic effect of cortisone was first reported by Baxter and Fraser (1950). Using the house mouse, an animal in which "spontaneous" cleft palate (without hare-lip) is rare, they administered cortisone to pregnant females and produced cleft palates in 44% of the offspring. The prevalence of cleft palate in the offspring of treated mothers varied between 4% and 100% in different strains of mice; the result depended partly on the genotype of the mother and partly on that of the fœtus (Fraser and Fainstat 1951, Fraser et al. 1954).

Fig. 2—Inferior aspect of cleft palate.

Fainstat (1954) treated pregnant rabbits with intramuscular cortisone and reported 17 cleft palates among 35 embryos from the 7 treated does. In the rabbit, also, the spontaneous occurrence of cleft palate without hare-lip is apparently rare.

It is apparent from these papers that the outcome of pregnancy in the treated animals is related to the dosage of cortisone, the period of gestation during which it is administered, and the genotypes of the mother and the fœtus. The highest prevalence of cleft palate in the offspring was obtained when treatment with cortisone was begun a few days before the time of normal closure of the palatal processes, thereby suggesting that it interferes with the development of the palate.

Discussion

Three aspects of this problem require careful consideration: (1) was the cleft palate reported here merely a chance finding? ; (2) are the conclusions of the experiments on laboratory animals applicable to man? ; and (3) in view of the increasing use of cortisone, why have congenital defects in human babies not been reported before?

A study of the series of clefts of the lip and palate reported from Denmark by Fogh-Andersen (1946) and from Britain by Oldfield (1950) and Holdsworth (1954) reveals a prevalence varying from 1 : 600 to 1 : 1000 live births. Of these 25–36% are isolated clefts of the palate, which were noted to be more common in female babies in two of the three reported series. In Denmark hereditary factors were present in 30–40% of the total group, but in British cases they were only present in 11% and 18%. Fogh-Andersen (1946) stated that isolated clefts of the palate seldom appeared to have a hereditary basis. These observations are inconclusive in determining the ætiology of the cleft palate in the present case.

If the results of the experiments on laboratory animals are applicable to man, to get a cleft palate it would be necessary to administer an effective dose of cortisone immediately before the time of closure of the palatal processes. In man these processes appear about the 45th day, and closure is normally complete by the 12th week. In the present case it appears reasonable to assume that fertilisation took place on or about Oct. 22; hence cortisone therapy began on the 38th day of pregnancy and continued throughout the time during which the palatal processes would normally have been fusing. Though it is accepted that there are objections to a comparison of the dosage used in animals with that used in man, on the basis of a milligramme of cortisone per kilogramme of body-weight, it has been suggested (Greenhill 1952) that an equivalent dose for a human being would be 4–8 g. of cortisone. Our patient received a total of 6 g., of which 4 g. was given between the presumed 38th and 52nd days of pregnancy.

There are many reports of the use of cortisone in human pregnancy, but in almost every instance it was administered after the 8th week and in a dosage considerably smaller than that used in the present case. These doses may not have been large enough to produce congenital abnormalities. Wells (1953) treated 29 cases of nausea and vomiting in early pregnancy with cortisone. Of the 27 women followed up 24 gave birth to normal babies, and the remaining 3 to babies with congenital malformations other than cleft palate, none of which were attributed to the treatment.

Conclusion

Though there is no justification for attributing the cleft palate reported here to the administration of cortisone to the mother in early pregnancy, it appears

reasonable to draw attention to the similarity between the experimental findings in animals and the present case. It appears desirable to exclude the possibility of early pregnancy before administering cortisone to women of child-bearing age.

We wish to thank Mr. Alan Brews and Prof. R. J. Harrison for permission to publish, and Mr. R. Q. Cox for the photograph.

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RUPTURE OF INTRA-ABDOMINAL ANEURYSM SIMULATING RENAL COLIC

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THE symptoms referable to aneurysm of the abdominal aorta were analysed by Osler (1905), who stated that the pain due to rupture may resemble the pain of renal colic, gall-stones, or appendicitis. He cited a case (Bryant 1903) which presented with pain similar to that of renal calculus, agonising in severity and radiating into the left groin and testis. Since then the frequency of aneurysm of the abdominal aorta has increased (Zech and Merendino 1954), and the proportion of arteriosclerotic to syphilitic aneurysms has been reversed: Osler (1905) gave a ratio of 1 : 10 whereas Maniglia and Gregory (1952) found the proportion to be 5 : 2.

This relative and absolute increase in the frequency of arteriosclerotic aneurysms has an important bearing on the symptoms. Syphilitic aneurysms commonly erode the vertebræ, whereas arteriosclerotic aneurysms rarely do so; as a result pain is an early symptom in the former but comes on much later and less often in the latter. Blakemore (1947) has pointed out that arteriosclerotic patients may in fact go to the brink of disaster before experiencing symptoms, and that the first symptom is often pain due to leakage from, or rupture of, the aneurysm.

Recent advances in anæsthetic and surgical techniques have made the treatment of abdominal aneurysms a practical proposition; arteriosclerotic aneurysms are particularly amenable to treatment as they often arise distal to the origin of the renal arteries. Blakemore (1947) produced satisfactory results in 3 patients with arteriosclerotic aneurysms employing a process of electrothermic coagulation, and Kinmonth et al. (1955) have successfully substituted a tube of 'Orlon' cloth for a large abdominal aneurysm. The fact that a condition which may be rapidly fatal can now be successfully treated makes early diagnosis imperative.

We report here 2 cases of fatal rupture of arteriosclerotic intra-abdominal aneurysms, both of which presented with severe abdominal pain indistinguishable from that of renal colic.

Case-reports

Case 1.—An engineer, aged 62, had been well until the day before admission to hospital. While travelling on a train in Germany he suddenly experienced severe pain in the left loin. It lasted only a few seconds but was accompanied by a feeling of faintness. The journey to England was continued without further incident, but shortly after leaving Liverpool Street Station next day the pain recurred with such agonising intensity that he lost consciousness. He was admitted to St. Bartholomew's Hospital as an acute abdominal emergency. There was no relevant past or family history.

On examination he had recovered consciousness but was still shocked, with pulse-rate 58, pulse regular, temperature 95°F, respirations 30 a minute, and blood-pressure 90/35 mm. Hg. He was obese; his pupils reacted to light and accommodation, and the fundi showed narrowed arterioles with arteriovenous nipping. There was tenderness in the left loin with guarding. Bowel sounds were normal.

Investigations.—Examination of the blood showed Hb 68%, white cells 13,700 per c.mm. (polymorphs 90%, lymphocytes 8%, monocytes 2%), erythrocyte-sedimentation rate 12 mm. in the first hour (Westergren). The urine contained a trace of protein but no blood; the blood-urea level was 80 mg. per 100 ml. Plain radiography of the abdomen showed no gaseous distension, subdiaphragmatic air, or renal calculi. Electrocardiography showed left ventricular hypertrophy with patchy myocardial ischæmia.

Course.—An hour after admission the patient felt better; his blood-pressure had risen to 160/80 mm. Hg and pulse-rate to 100. Three-quarters of an hour later he had an attack resembling typical renal colic, which consisted of severe pain in the left loin radiating into the left groin and penis. His blood-presure fell, but he did not lose consciousness. Atropine sulphate gr. $^1/_{100}$ was given subcutaneously, and the pain subsided. Three and a half hours later he again collapsed, his blood-pressure falling to 95/40 mm. Hg, but on this occasion there was no pain. For the next twelve hours, throughout the night, he remained shocked but pain-free. Next morning a definite pulsatile mass was palpable in his left loin.

Exploratory laparotomy was performed by Mr. John Hosford, who found that a large aneurysm of the abdominal aorta had ruptured into the retroperitoneal tissues. No treatment was possible, and the patient died thirty-one hours after admission and sixty-one hours after the onset of the first symptom.

Necropsy revealed widespread atherosclerosis affecting especially the coronary vessels and the abdominal aorta. There was marked left ventricular hypertrophy, the kidneys appeared normal, and there were no calculi in the urinary tract. Immediately distal to the origin of the renal arteries the abdominal aorta had a large fusiform aneurysmal dilatation with additional sacculation to the right, the maximal circumference being 19 cm. The left lateral wall of the abdominal aorta 3 cm. above the bifurcation had an irregular tear 2·5 cm. long. The rupture communicated with a retroperitoneal hæmatoma which surrounded the left kidney and ureter and extended into the soft tissues of the pelvis on the left side. Sections of the abdominal aorta showed extensive atheromatous lesions.

Case 2.—A cable operator, aged 55, had been a known hypertensive for five years with a blood-pressure of 240/140 mm. Hg, and two years before admission he had had an isolated episode of hæmaturia. On the morning of the day of admission he developed, following defæcation, an aching right-sided abdominal pain which radiated into the right testis. The pain subsided after a few minutes but recurred momentarily with much greater intensity in the afternoon. This second attack of pain was succeeded by a desire to defæcate again, but before he could do this he lost consciousness. He was admitted to St. Bartholomew's Hospital as an acute abdominal emergency half an hour later. When first seen his complaint was of severe pain in the right testis and an aching pain in the right iliac fossa and groin. There was no other relevant past or family history.

On examination he was obese, shocked, and in severe pain, with temperature 95°F, pulse-rate 114, pulse regular, respirations 22 a minute, and blood-pressure 65/50 mm. Hg. His pupils reacted to light and accommodation, and his fundi showed narrowed arterioles with arteriovenous nipping. He had diffuse lower abdominal tenderness with guarding on the right side and severe tenderness in the right groin. Bowel sounds were present, and the external genitalia were normal. The right testis was not retracted, but the right cremasteric reflex was absent. The femoral pulses were palpable and equal.

Investigations.—The urine contained a trace of protein but no blood; the blood-urea level was 80 mg. per 100 ml., serum-amylase 6 Wohlgemuth units, and plain radiography of the abdomen revealed gall-stones.

Diagnosis.—Torsion of the testis was excluded by the normal appearance of the testes. Severe renal colic was thought to be the next most likely diagnosis; but acute pancreatitis, perforated peptic ulcer, and coronary thrombosis were considered in the differential diagnosis. It was suggested by one of us that "dilatation of, or leakage from, the abdominal aorta or a peripheral (intra-abdominal) artery, such as the renal artery, would explain the picture," but this opinion was not held sufficiently strongly to lead to laparotomy.

Course.—The severe pain subsided in thirty minutes, but a dull ache in the right loin and groin remained. The blood-pressure rose to 120/80 mm. Hg. No new physical signs appeared, but over the course of the next three days there were transitory attacks of pain which radiated from the right loin to the groin. The pain appeared to be relieved by subcutaneous atropine sulphate. Despite an adequate fluid intake the output of urine decreased and the blood-urea level rose to 180 mg. per 100 ml. On the third day the patient again collapsed with severe pain in the right loin and groin, and he died an hour later—ninety-two hours after the appearance of his first symptom.

Necropsy revealed gross left ventricular hypertrophy. The gall-bladder contained gall-stones, but the kidneys were macroscopically normal, and there were no calculi in the urinary tract. The aorta showed a little atheroma, mainly in the abdominal region, and there was a saccular aneurysm 2·5 cm. in diameter in the lateral wall of the right common iliac artery 4 cm. from its origin. There was a linear rupture 1 cm. long in the wall of the aneurysm. The adventitia had been dissected from the media over an area extending 3 cm. from the tear, the gap between the two layers containing blood-clot. In continuity with the tear there was a large retroperitoneal hæmatoma filling the right iliac fossa and right half of the pelvis and extending superiorly as far as the perirenal area. Section of the kidneys showed benign hypertensive disease, and the aorta showed moderate atheromatous changes in the intima, but the wall of the aneurysm showed no evidence of arteriosclerosis or syphilis.

Discussion

Arteriosclerotic aneurysms develop almost exclusively after middle age. Of 97 patients with such lesions reported by Estes (1950) all were aged more than 40, and about 70% were aged more than 60. Rupture of or leakage from such an aneurysm may never occur, the condition remaining undiscovered until necropsy; alternatively it may give rise to symptoms which lead to its being diagnosed before it ruptures.

Of Blakemore's (1947) 26 patients 5 presented with a pulsatile abdominal mass, 1 with pain resembling that of duodenal ulcer, and 1 with symptoms referable to duodenal ileus and obstruction.

Only 4 of 15 patients described by Scott (1944) had symptoms—in each case aching pain in the lower abdomen and back.

More rarely symptoms may result from pressure on other intra-abdominal organs, but very much less frequently than is the case with syphilitic abdominal aneurysms. An aneurysm may rupture silently, leading to rapid death, or into the gastro-intestinal tract, most frequently the duodenum, producing hæmatemesis and/or melæna.

Rupture is often preceded by a leak, in which case the patient may present with severe pain as an acute abdominal emergency.

Of Blakemore's (1947) 26 patients 11 presented with severe pain heralding rupture.

Of 61 cases reported by Zech and Merendino (1954) in 24 severe pain came on before rupture, and in 7 laparotomy was undertaken for what were thought to be acute abdominal emergencies. The preoperative diagnoses were perforated peptic ulcer (4), urinary retention (1), pancreatitis (1) and volvulus (1).

Of the patients reported by Hubeny and Pollack (1940) 2 presented with acute pain preceding rupture, and both were diagnosed as having a perforated peptic ulcer. Whether these cases were syphilitic or arteriosclerotic is not stated.

Of great importance is the time which may elapse between the onset of the first pain due to the initial leak and death from rupture. In Estes's (1950) series were 6 patients who survived ten hours, five days, four weeks, four weeks, six months, and four years respectively after the first leak. In 8 of the cases reported by Zech and Merendino (1954) small leaks had sealed before the aneurysm ultimately ruptured. In the 2 present cases the intervals between the first pain and death from rupture were sixty-one and ninety-two hours. It is during this period that surgical treatment might be attempted.

It is not clear why the pain resembled renal colic in the present cases. It is unlikely that it was due to sudden dilatation of a blood-vessel, but the dissection of the iliac artery in case 2 might explain the initial severe pain. It is possible but improbable that the presence of blood-clot surrounding the ureter on the affected side in each case caused ureteric spasm and pain. It seems more likely that the pain was due to leaking blood dissecting the retroperitoneal fascial planes and muscles of the first and second lumbar segments, for Kellgren (1937) has shown how pain resembling that of renal colic may be produced by injecting saline solution into the interspinous ligaments and muscles of the first lumbar segment.

There were two striking clinical features seen in both patients: the extreme degree of shock, which was comparable to that seen in association with myocardial infarction, and the relative speed with which the severe pain disappeared. The absence of firm evidence of other intra-abdominal conditions which could cause the symptoms might have led us to consider more seriously a vascular cause for the pain, particularly as both patients were aged more than 50 and had widespread signs of arteriosclerosis. Case 2 had, however, had a previous episode of hæmaturia and also showed radiographic evidence of gall-stones, while the diagnosis of renal colic was supported in both cases by proteinuria and a raised blood-urea level. An interesting clinical point in case 2 was the absence of the right cremasteric reflex, probably resulting from pressure of blood-clot on the right genitofemoral nerve.

It would be unwise to generalise on the basis of these 2 cases, but the sudden occurrence, in an arteriosclerotic subject, of a relatively short-lived but severe abdominal pain associated with severe shock should suggest the possibility of its being due to a leak from an intra-abdominal aneurysm.

Summary

The first symptom of an arteriosclerotic intra-abdominal aneurysm may be severe abdominal pain of sudden onset, resulting from a leak and mimicking that of other acute abdominal emergencies.

With the advent of new anæsthetic and surgical techniques treatment of such aneurysms is now practicable; and since an appreciable time may elapse between the onset of the first symptom due to a leak and death from rupture, early diagnosis is of paramount importance.

An account is given of 2 fatal cases of ruptured intra-abdominal aneurysm, both of which presented with severe pain resembling renal colic.

We are grateful to Dr. E. R. Cullinan and Mr. John Hosford for permission to publish, and to Dr. R. Finlayson and Dr. P. J. A. Butcher for the necropsy reports.

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Reviews of Books

Atlas Illustrating the Topographical Anatomy of the Head, Neck and Trunk

The late JOHNSON SYMINGTON, M.D., F.R.C.S., F.R.S., professor of anatomy, The Queen's University, Belfast. Edinburgh: Oliver & Boyd. 1956. £5 5s.

THIS atlas first appeared in 1917, and the plates and copyright were bequeathed to the Anatomical Society of Great Britain and Ireland by Professor Symington's daughter in 1932. In response to many requests, the council of the society has now decided to republish the atlas, using the original blocks. The plates are life-sized half-tone drawings of a series of cross-sections taken at regular intervals through two male adult bodies, one serving for the trunk and the other for the head and neck. The accompanying reconstructions show the levels of the sections in relation to the skeletal features. The plates are printed on thick glossy paper and are stored in a stout and convenient portfolio. The reproduction is good, and the main features of each section are adequately labelled; the whole atlas forms a justly renowned contribution to cross-sectional anatomy. Since the pictures are life-size, direct measurements may be made on them from the surface to any desired structure, and experience has already shown their very great value to surgeons and radiologists. A new generation of anatomists will also welcome the reappearance of this old friend of their seniors, for there can be no doubt of the usefulness of cross-sections in making the student revise his topographical knowledge.

Nursing Care of the Newly Born Infant

W. S. CRAIG, M.D., F.R.C.P., professor of pædiatrics and child health, University of Leeds. In collaboration with M. F. G. BUCHANAN, M.R.C.P.E., R. J. PUGH, M.R.C.P., M. PATTULLO, R.G.N., S.C.M., and M. J. W. TAYLOR, R.G.N., S.C.M., M.T.D. Edinburgh: E. & S. Livingstone. 1955. Pp. 472. 35s.

THIS is an excellent work which every midwife should read, and which every obstetrician should insist is kept in his department.

Not long ago the newborn infant was often looked on as a by-product of the art of obstetrics, and obstetricians bothered very little about this side of their business. Pædiatricians were "new-fangled upstarts" who were forbidden entry, so that the care of the infant fell to the midwife, who wielded far more power than either her training or knowledge justified. Happily that phase is passing, and the midwife now shares with the pædiatrician the nursing care of the newborn. This book will be of immense value in teaching her the reasons for what she does; and moreover it never suggests that she takes any therapeutic action beyond her ability. Of equal importance is the stress laid on observing those minutiæ of behaviour whose early recognition may make all the difference between death and survival.

The text is liberally illustrated; but, with few exceptions, the colour photographs are noticeably less effective than those in black and white.

Mistakes are remarkably rare, but one on p. 168, on the use of full-cream dried milk, may lead to some carbohydrate diarrhœa. The section on mothercraft is a little less impressive than the rest of the book; it is often open to doubt whether doctors or midwives really know more about this subject than mothers themselves.

A successful future is assured for Professor Craig's book.

Cardiac Diagnosis

A Physiologic Approach. ROBERT F. RUSHMER, M.D., associate professor of physiology and biophysics, University of Washington Medical School. Philadelphia and London: W. B. Saunders. 1955. Pp. 429. 80s. 6d.

AT the start of his clinical work, the student is often told to study the principles of medicine in his textbook of physiology. Unfortunately most books on applied physiology fail to make close contact with everyday medicine, and there is a big gap between the pure physiology book and most textbooks of medicine. This gap is now filled in cardiology by Dr. Rushmer's valuable book. It will attract all those interested in understanding the principles of cardiology, from student to cardiologist.

The book is well written and illustrated, each legend being self-explanatory. The selection and arrangement of the material is excellent, and everything is based on general principles which would be difficult to find elsewhere in book form. As Dr. Rushmer points out at the beginning of the chapter on electrocardiographic interpretation, the approach to this subject may be empirical or theoretical. Successful empirical interpretation involves long experience and lengthy description, making it impracticable for most cardiologists. On the other hand, the theory of electrocardiography is now sufficiently accurate to give a good working knowledge of the subject, and its principles are clearly described in this book.

The logical approach sometimes results in anomalies, such as the appearance of thyroid disorders under the heading of myocardial ischæmia. When hypotheses are many and conflicting, the author has lost a little of his enthusiastic simplification, and this is evident in the chapter on heart-failure. This is not the book in which to look for clinical details, but it is a pity to find no mention of the waterhammer pulse in the section on patent ductus. The systolic murmur of mitral incompetence is described as mid-systolic, finishing before the second sound, which fits neither the facts nor the theory, since the pressure difference between auricle and ventricle, and hence regurgitation and murmur, must be great at the time of closure of the aortic valve.

Multiple Neurofibromatosis

A Clinical, Pathological and Genetical Study. FRANK W. CROWE, M.D., WILLIAM J. SCHULL, PH.D., and JAMES V. NEEL, M.D., PH.D., Institute of Human Biology, University of Michigan. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956. Pp. 181. 36s.

THIS is in essence a statistical and genetical study of 223 cases of neurofibromatosis (the word multiple is surely redundant) in Michigan.

Just under 28% of these people were attending hospital for conditions unrelated to the disease, while about 18% came for cosmetic reasons only. 78% had six or more café-au-lait spots, whereas no normal person was seen with this number. A consistent finding of much diagnostic value was the violaceous colour associated with the tiniest neurofibromas, which from the first were papular (demonstrable by oblique light) and tended to be invaginated. Another was the frequency with which osseous lesions were noted.

About half the patients had affected relatives, and it was calculated that the rate with which the gene or genes responsible for the trait arose through mutation must be approximately 1×10^{-4} per gamete per generation: this, it is claimed, is the highest yet encountered for a dominantly inherited trait. No significant intrafamily similarities in tumour location were noted, except for the tendency of palmar and plantar neurofibromas to be present in some families and not in others. The cases, however, were hardly numerous enough for investigation of the inheritance of acoustic neuromas.

The authors make interesting observations on the pathology of neurofibromas and especially the presence in them of mast cells. They draw attention to the inadequacy of most case-histories of optic-nerve gliomas and hint that this condition may, more often than we think, exist in association with neurofibromatosis. Further study may show that the subnormal mentality so common in families of patients with neurofibromatosis often has a structural basis.

Advances in Virus Research

Vol. III. Editors: KENNETH M. SMITH, F.R.S., virus research unit, Molteno Institute, Cambridge; MAX A. LAUFFER, department of biophysics, University of Pittsburgh, Pennsylvania. New York: Academic Press. London: Academic Books. 1955. Pp. 338. £3 4s.

THE reviews in *Advances in Virus Research*, which now occupies a very useful place in the reading of those who study viruses, are written by people with first-hand knowledge of their subject, so that many of the articles reach a higher standard of critical analysis than is found in most reviews. The editors also do well in avoiding catalogues of references.

Three articles in the new volume reflect the present interest in virus nucleic acids. There is a fascinating and shrewd survey by Seymour S. Cohen of comparative biochemistry and virology; a thorough account of the chemotherapy of viruses, with the accent on compounds which interfere with nucleic-acid metabolism, by R. E. F. Matthews and J. D. Smith; and a very interesting description of bacterial transformations by Harriet Ephrussi-Taylor. An article by J. W. Beard, D. G. Sharp, and E. A. Eckert on tumour viruses is concerned mainly with the Shope papilloma and avian erythromyeloblastic leucosis viruses. This is the only article which deals specifically with animal viruses; and the views it gives will command respect if not universal agreement. K. M. Smith discusses the development of insect viruses as studied by morphological methods. K. Maramorosch describes the evidence which establishes conclusively the multiplication of plant viruses in their insect vectors, a finding which is full of striking implications concerned with the origin and nature of viruses. Finally, L. O. Kunkel writes on the phenomenon of cross-protection between strains of Yellows-type viruses.

Das Phasenkontrastverfahren in der Hämatologie

H. G. HANSEN, DR.MED., oberarzt, University Children's Clinic, Kiel, and ALEXANDER ROMINGER. Hamburg: Stormarn Verlag. 1955. Pp. 169. DM.16.

THIS book shows very well the results obtainable with phase-contrast microscopy applied to blood and bone-marrow studies. There are some 250 excellently reproduced photomicrographs, and the range of illustrations is remarkably complete. Technical detail about the photographs is given, and it must be pleasant to work with such well-suited apparatus. If anyone wishes to study the possibilities, and the limitations, of this technique, he cannot do better than consult this volume.

Practical Hæmatology (2nd ed. London: J. & A. Churchill. 1956. Pp. 229. 20*s*.).—The second edition of Dr. J. V. Dacie's valuable handbook is half as long again as the first. Previous sections have been expanded and new ones added, such as those on the L.E. cell and abnormal hæmoglobins. The book still concentrates on the quantitative tests of hæmatology and omits any descriptive morphology, for which other books are available to the student. The new edition has been rewritten to such an extent that it is almost a new book. The section on blood-coagulation is entirely revised and now gives details of tests such as the thromboplastin generation test and the assay of antihæmophilic globulin. Tests for platelet antibodies are given, but Dr. Dacie finds none of them entirely satisfactory. This assessment of the value of new methods is a feature we are glad to see, and it is clear that no method has been included just because it is new. There is an adequate section on blood-groups. The detail about recommended methods is notably complete and ensures that this edition will be as welcome and as constantly used as its predecessor.

Some of the Answers (Ilfracombe: Stockwell. 1956. Pp. 160. 10*s*. 6*d*.).—In his 25 short chapters of advice Dr. G. C. Milner ranges over subjects great and small—from piles, colds, and chilblains to religion and economics. On all he has definite views. Much of his advice is such as might be expected from a thoughtful and experienced family doctor and he has helpful things to say about worry and anxiety, matrimony, pregnancy, childbirth, and the elements of economics. On some other subjects he is less happy. Tinct. quin. ammon., saline douching, and frequent nose-blowing for the early cold, lying prone for epistaxis, and scrubbing with boiled nail-brush and covering with plain elastic adhesive bandage for grazes will seem doubtful expedients to many, and it is hard to believe that "there are many occasions when a baby of six months is the better for being slapped hard across the buttocks."

Histamine (London: J. & A. Churchill. 1956. Pp. 472. 50*s*.).—Last year the Physiological Society and the British Pharmacological Society joined forces with the Ciba Foundation to hold a series of meetings on this subject in honour of Sir Henry Dale, O.M. The proceedings of these symposia have now been published under the editorship of Dr. G. E. W. Wolstenholme and Miss Cecilia O'Connor.

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King's College Hospital and Postgraduate Medical School, London

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THE LANCET

LONDON: SATURDAY, JUNE, 30, 1956

21st-Century Man

FOR many years the public of the Western countries has been warned about next century. Science, the prophets have said, will destroy man. He will be annihilated by atomic bombs (the products of unregenerate science), or be herded in ant-like societies whose rulers (thanks to science) can spy on him by television, influence him by waves, or steal his brain and replace it with their own—projects all curiously familiar to a medical listener. More respectably, man will simply starve through overpopulation, caused by our folly in extending medical care to our poor relations, or become half-witted through failure to propagate an intellectual aristocracy. While there is time, let him turn back; let him abandon science and revert to common sense, the tribal deities, and the past.

Our generation, certainly, is qualified to recognise danger. It has seen what can be done by a HITLER, and it still lives in the knowledge that a handful of psychopaths could bring human history to an end. But in recognising danger we need not lose our sense of proportion; and we should know by this time that the forces most likely to translate such threats into reality are, first, paranoid fear, and secondly a conviction that the future holds nothing for us. Warnings we may need, but the prediction of doom through science should be seen as mostly nonsense, and its goblins as part of a psychoneurotic, if not psychotic, fauna. The dangers to humanity are, as always, grave; but at no time has man been better placed to deal with them. The true defence is not to turn back to anything but to turn forward—not less knowledge and freedom but more. This is a task which medicine and science cannot afford to neglect. The faster the change in our societies, the greater the need to foresee and prepare.

In a "speculative projection" of 21st-century man lately published by the California Institute of Technology,[1] it is impressive to find the writers unanimous in repudiating the "starvationist" theory of future history. The world's population is increasing and will continue to do so; but if the newcomers are not fed the reason will not lie in the inability of technology to feed them. According to the California workers, irrigation and reclaiming of marginal land, and the control of insect pests, would in themselves suffice to raise food output by nearly half. Beyond that lie the possibilities of new crops, the substitution of synthetics and of microörganisms for animal foods, and the harvesting of the sea, where nine-tenths of the world's photosynthesis takes place: "what we need," said one participant, "is to breed a sea-going pig." Work on such lines is already in progress (some will have seen the "mechanical cow" built by N. W. PIRIE and his co-workers at Rothamsted); and, though the appeal of food research to governments is less than that of destructive undertakings, it goes on, and may go faster. For the California scientists, the limiting factor of this expansion is the availability of skilled men: in the initial stages of technological revolution, the number of man-hours per calorie or per kilowatt-hour may fall; but it is now climbing back to, and even beyond, its old level, with the difference that the new kind of labour requires aptitudes and training of a very high order in a very large number of people. Here the problems are medical as well as technical; for psychological stress among scientists, research men, and skilled technicians is already clinically evident, and there would be further strains in a society which had no place for the stupid. But shortage of skilled cadres—important though it may be—is not the limiting factor that we should ourselves put first. If the world is not fed when technology could feed it, or healed when medicine could heal it, the reasons are most likely, we should say, to lie in the form of human societies and the prejudices and interests they harbour. In other words, they are political.

It is easy at this point to turn away, remarking that "science has no place in politics." But the fact remains that the two major political issues of the world today are both of them largely issues of science—the first being the extension of high living standards to all nations, while the second is the tendency for social organisation to become a vehicle for national and personal aggression. If these issues are to be dealt with by scientific causal analysis—instead of by the combination of dogma and vested interest which has hitherto been customary—the medical scientist cannot opt out of them. Whether the approach of social psychology is less vitiated by personal and cultural prejudice and bias than that of "politics" as we understand it, only time can show: admittedly the discipline of science does not always succeed in controlling the scientist's judgments against the pull of his prejudices. But it is clear that ways and means better than those of the present can and must be found.

One part of the political future of man is already being influenced by science in a sense opposite to that prophesied by the pessimists. In the past, societies which drew their dynamic from rigid ideologies and conformities were not seriously hampered by them in imposing themselves on the world and their neighbours. In some respects these "armoured cultures" were at an advantage: they lost their art, their literature, and their capacity for enjoyment, but not their competitive efficiency. But once scientific technology comes to be the chief qualification which enables a society to compete, this situation is likely to change. In such a world ideologies have immediate and evident consequences: relativity may be a philosophical concept, but if it is an erroneous one we must alter the design of our electronic equipment. Thus a society may have to choose between "bourgeois" genetics and no beef, or between "communistic" economics and no production. Moreover, the continued competitive efficiency of a neotechnic culture will depend on the attitudes of the men it produces—their receptivity, spontaneity, capacity for social action, and lack of biases—and these will be continuously exposed to practical tests. When the most biased dictator of the future sets his most fanatical henchmen to build up a supersonic air force, they will still be unable to train pilots without at the same time training and employing psychologists whose studies of human behaviour will call the dictator's mental state in

1. See *New York Times*, May 21, 1956.

question, and engineers who, if their machines are to leave the ground, will be unable to accept the dogma that 2=3. However much we allow, as we must, for the human power of double-think, which affects scientists as much as (some would say more than) their fellows, the continued growth of analytical and purposive study of Nature must give rise to more analytical and purposive study of ourselves, of society, and of the pretensions of would-be leaders or rulers.

21st-century man will have his own troubles. He may look back at ours as an age of inequality and ideology, in which societies still delegated authority to essentially aggressive or prohibitive people; as the age in which it became possible first to control disease and hunger and then (by applying the same methods of thought) to control the antisocial, irrational, and incoördinate sides of human conduct which obstructed the application of knowledge; and possibly as the golden age of science in general. Since the exponential progress of knowledge can hardly go on indefinitely without some pause, our grandsons may spend the 21st century in drawing breath, and in allowing civilisation to catch up with the practical and intellectual progress made in the time of strife and excitement which preceded it. But if they read our literature, they will have less respect for the Jeremiahs and the Jonahs who foretold judgment than for the Ezras who urged their contemporaries to rebuild the Temple.

British B.C.G.

THE rather tentative official support for B.C.G. in this country in the past few years has been fortified by a statistically unassailable experiment [1]; and, although the vaccine cannot yet be freely used, there are signs that control is being relaxed. So far all the B.C.G. vaccine routinely used in this country has been imported. But the first report of a British B.C.G., a freeze-dried vaccine, has now appeared.[2] Freeze-dried vaccine, if it is as consistently potent as the liquid products, has obvious advantages. It can be kept for many months at room-temperature without serious loss of potency, so that each batch can be fully tested before it is released. Instead of having to be ordered in advance and used without a delay, the freeze-dried product can be kept in store and is promptly available—an obvious advantage to those who use it infrequently and in small quantities. Freeze-dried vaccines have been manufactured and tested in many countries, notably in France,[3] the United States,[4] Russia,[5] and Japan.[6 7] The extensive Japanese experience of its manufacture has recently been reviewed by OBAYASHI in a W.H.O. monograph.[8]

The new British vaccine was produced in the Glaxo laboratories and, after detailed bacteriological and animal tests, two batches were put to clinical trial. LORBER and his colleagues [2] vaccinated 276 newborn infants. After six weeks 88% of those vaccinated with one batch and 77% of those vaccinated with the other gave a positive tuberculin skin reaction. But twelve weeks after vaccination the proportions of "convertors" had risen to 96% and 92%. This delay in the appearance of the sensitivity produced by freeze-dried vaccine was also noted by EBINA et al. The vaccination lesions were small and in only 8 infants were there palpably enlarged axillary lymph-nodes. None had any detectable general disturbance of health. The vaccine was kept at room-temperature during the fourteen weeks of the trial. There was no important change in the vaccine during this period and counts of viable cells were of the same order as at the start of the investigation. LORBER et al. believe that this particular British freeze-dried vaccine would not be suitable for vaccination of contacts; for it may be desirable in contacts to induce tuberculin skin sensitivity as quickly as possible with the least risk of failure. This is, however, not a serious deficiency; for most of the vaccine required in this country will probably be needed for routine vaccination of those not especially exposed to infection.

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3. Gernez-Rieux, C., Gervois, M., Ramon, P., Tacquet, A. *Rev. Tuberc., Paris*, 1951, **15**, 1154.
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Hypercalcæmia in Infancy

SINCE the benign [1] and severe [2] types of idiopathic hypercalcæmia in infancy were first described, many cases have been recorded,[3–16] and we have from time to time discussed these developments.[17 18] The clinical pattern is well defined: anorexia, vomiting, constipation, and failure to thrive, with raised serum-calcium and blood-urea levels. The outlook in the simple group is generally good, although there have been occasional deaths; but in the severe type, with physical and mental retardation, patchy osteosclerosis, renal failure, and hypertension, recovery is often incomplete and death is not rare. In a recent issue Dr. MORGAN and his colleagues [19] described 15 cases seen in Dundee during a period of two years and they gave a detailed account of metabolic studies in 2 hypercalcæmic infants. Their conclusions confirm previous reports of high calcium retention,[8 11 15 20] and the beneficial effects of low-calcium diet and of cortisone,[9 21] which, they found, increased the fæcal calcium. Dr. MORGAN and his associates do not favour the use of calcium-chelating agents, such as disodium ethylenediamine-tetracetic acid (E.D.T.A.), because of the gastro-intestinal irritation they produce. Like most of those who have studied this syndrome, they feel that the most likely cause is an over-action of vitamin D. Dr. LIGHTWOOD and his colleagues in the pædiatric unit at St. Mary's Hospital, London,

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3. Lightwood, R. C. *Arch. Dis. Childh.* 1952, **27**, 302.
4. Payne, W. W. *Ibid.*
5. Creery, R. D. G. *Lancet*, 1953, ii, 17.
6. Harris, L. C. *Arch. Dis. Childh.* 1954, **29**, 232.
7. Ferguson, A. W., McGowan, G. K. *Lancet*, 1954, i, 1272.
8. Lowe, K. G., Henderson, J. L., Park, W. W., McGreal, D. A. *Ibid*, 1954, ii, 101.
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16. Schlesinger, B. E., Butler, N. R., Black, J. A. *Brit. med. J.* 1956, i, 127.
17. *Lancet*, 1954, ii, 127.
18. *Ibid*, 1955, ii, 1327.
19. Morgan, H. G., Mitchell, R. G., Stowers, J. M., Thomson, J. *Ibid*, June 16, 1956, p. 925.
20. Macdonald, W. B., Stapleton, T. *Acta. pædiat., Stockh.* 1955, **44**, 559.
21. Fanconi, G., Spahr, A. *Helv. pædiat. acta*, 1955, **10**, 156.

lately described [22] the management of a single case of hypercalcæmia with a virtually calcium-free milk. The calcium balance was strongly positive during the active stage; it became negative on a low-calcium diet, and more strongly so when a low-calcium cereal was given in addition. This change may be due to the high content of phytate and inorganic phosphorus in the low-calcium cereal; the consequent binding of intestinal calcium would increase the fæcal loss. Cortisone had a quicker initial action, but there may be undesirable side effects, such as the risk of intercurrent infection. A diet low in calcium is difficult to prepare and manage, but it seems to give adequate results without the hazards of cortisone. A point of great interest in the St. Mary's patient was the disappearance of hypertension and cardiac murmur during treatment: these are signs usually found only in children severely affected. It seems likely that the clear-cut distinction between the simple and severe cases [23] is to some extent artificial, since examples of an intermediate type occasionally appear.

Last week Dr. FORFAR and his colleagues discussed 5 cases of infantile hypercalcæmia, and a possible 6th. They are not satisfied that the syndrome can be fully explained on the basis of intolerance to vitamin D. As points against the vitamin-D hypothesis, they showed that some at least of these infants were not particularly sensitive to large doses of calciferol, and that calciferol does not increase the urinary output of calcium, as would be expected in hypervitaminosis D. They also showed that, in 1 child, citrate metabolism was more in keeping with rickets than with hypercalcæmia. In 4 out of 5 cases they found an increase in plasma-cholesterol levels—a finding previously reported [8–10 16 20] without comment. Their conclusion, with statistical support, is that there is a significant positive correlation between serum-calcium and plasma-cholesterol levels, which would not have been expected had the cause of the condition been vitamin-D intoxication. Idiopathic hypercalcæmia of infancy may result, they believe, from a disturbance of cholesterol metabolism leading to the formation of a toxic calcium-raising substance of sterol type allied to vitamin D, which itself may be an aggravating factor. The cholesterol disturbance may be due to infection. This is an attractive if rather speculative explanation. The points against vitamin D will require confirmation, and future research might include an effort to link this disorder of cholesterol metabolism with the abnormality of plasma-vitamin-A levels reported by FYFE.[24] He found in 8 cases that the fasting and post-absorption levels of vitamin A were higher than in controls. Even if no direct relation were to be found between these two findings, further work might reveal other and more fundamental disturbances of fat metabolism. It should not be overlooked that both cholesterol [16] and vitamin-A derangement [25] could be secondary to a renal lesion, as has been found in the nephrotic syndrome. One point which is hard to explain on the cholesterol hypothesis is why the condition, so common in Great Britain and Northern Ireland, should be virtually unknown in North America, where the diet and infections of infancy are little different from those of this country.

Another contribution to this subject appears on an earlier page of this issue, where Dr. RHANEY and Dr. MITCHELL extend the pathological picture in a report of three children who died of hypercalcæmia. The most striking lesion was renal calcification, mainly medullary. These changes are non-specific and have been found in hypervitaminosis D, renal acidosis, and in other diseases of infancy.

From the evidence which has accumulated in recent years, we may conclude that infantile hypercalcæmia is a relatively common condition in Britain; that it is the cause of much ill health and interference with growth; and that it is sometimes responsible for mental defect and even death. As Dr. RHANEY and Dr. MITCHELL point out, the evidence implicating vitamin-D intoxication in idiopathic hypercalcæmia is, at the best, circumstantial. Much obviously remains to be done to define the ultimate causes, and in the meantime we should acknowledge that the recognition and better understanding of this peculiar syndrome have led us to realise that many babies in these islands are now receiving more vitamin D than they require.[26] If a general reduction in the intake of vitamin D to physiological levels (say, 400 to 800 international units per day) were to be followed by a decline in the incidence of hypercalcæmia throughout the country, the case against vitamin D would be the stronger. Until the problem is solved, babies should be given doses of the vitamin within the physiological range which we know to be adequate in protecting nearly all of them against rickets.

22. Stapleton, T., Macdonald, W. B., Lightwood, R. *Lancet*, June 16, 1956, p. 932.
23. Lightwood, R. C., Stapleton, T. *Ibid*, 1953, ii, 255.
24. Fyfe, W. M. *Ibid*, May 5, 1956, p. 610.
25. Kagan, B. M., Thomas, E. M., Jordan, D. A., Abt, A. F. *J. clin. Invest.* 1950, **29**, 141.
26. Creery, R. D. G., Neill, D. W. *Lancet*, 1955, ii, 372.
27. The Royal Northern Hospital, 1856–1956. By E. C. O. JEWESBURY, M.D., M.R.C.P. London: H. K. Lewis. 1956. Pp. 157. 17*s*. 6*d*.

Annotations

THE ROYAL NORTHERN HOSPITAL'S CENTENARY

AT the age of 30 Sherard Freeman Statham was a promising assistant surgeon at University College Hospital when, on May 14, 1856, he playfully slapped the exposed buttocks of a man on the operating-table, thereby raising a laugh from the class. John Erickson, the professor of surgery, who was about to operate, later reported this boisterous episode to the dean of the faculty. He complained, too, that his spirited colleague had, on the same day used improper adjectives and expletives to a patient who was reluctant to inhale the chloroform before "a very dangerous capital operation." The council of University College deplored such conduct and, after interviewing Statham and hearing the views of the medical and lay committees, they directed that he should cease to be assistant surgeon. The disconsolate surgeon returned to his rooms at 42, Mortimer Street, and what passed through his mind we do not know. But he was not one to remain idle for long and his restless energies were soon directed, it seems, to the mounting needs of the poor of North London, for whom medical and surgical care barely existed. He thereupon secured the lease of modest premises in York Road (now York Way), King's Cross, and, with the support of his dentist brother, and of Dr. G. F. Whidborne and Dr. C. P. Croft, he founded the Great Northern Hospital with some 16 beds. The doors were opened one hundred years ago, on June 30, 1856.

The story of this great hospital's achievements from its beginnings to the present day has been recorded by Dr. E. C. O. Jewesbury in a fine history [27] prepared

for the centenary. The early days were spent in the densely populated neighbourhood of the New Cattle Market and the Great Northern Railway Station with its growing maze of goods yards. Within twelve years the lively embryo of a hospital had outgrown its premises so that the next stage had to be spent in Caledonian Road. Here artisans and labourers in need of attention flocked to the well-managed outpatient department, where finely dressed people were refused admission. Three quarts of cod-liver oil and an ounce of quinine were dispensed each day, and a donation of half a crown was guaranteed to secure immediate attention. As we said at the time, it was a model outpatient department. In 1888, however, a newly built and fully grown hospital, the pride of Islington and the adjoining districts, first graced the Holloway Road, and there it has remained. Poor Statham, whose initial contribution of £1430, so generously given, appears to have been followed of necessity by other donations, died at 32 of phthisis. He was a bachelor and left only £500. The "Founder of the Great Northern Hospital, London" is buried at Stone, near Aylesbury, in the church where he was baptised. The scarlet tunic with epaulettes, and the trousers, which he wore in the Schleswig-Holstein campaigns, together with his watch and medals, are preserved as a memento of an erstwhile gallant soldier who had early interests in war surgery and army hygiene. Perhaps it was indifferent health which deterred him from going to the Crimean War as he had asked to do, and perhaps the subsequent frustration accounted for those indiscretions which led to his dismissal from University College Hospital—and to the foundation of another charity.

The Royal Northern Hospital, it may be justly said, has had a meteoric career. From the start it attracted fine consultants, zealous administrators, and boards composed of far-sighted laymen. It has also been fortunate in securing, throughout most of its life, the patronage and continued interest of the Royal Family. Successfully it overcame the threat of insolvency, and in doing so it was the first to introduce such things as pay-beds, which at the time (1894) were opposed on principle by the general practitioners of North London and by *The Lancet* and *British Medical Journal*. But when, in 1888, a heavy legacy duty deprived the hospital of much-wanted money, we spoke sharply in support of the Royal Northern: "In other countries the State maintains the hospitals. In ours this duty is not only thrown on private individuals, but even their charity is taxed."

Quite apart from its merits as a story, Dr. Jewesbury's book will give encouragement to those who believe that the tradition of voluntary service need not lapse because funds for the hospitals are now provided publicly.

THE BLIND IN OUR MIDST

IN the next twenty years the blind in England are likely to increase in number from the present 94,000 or so to 140,000 or more; and by 1958–59 schools for the blind will have to cater for some 2200 children, instead of some 1400 as in recent years. These forecasts, amply supported by figures, are contained in the latest of Prof. Arnold Sorsby's valuable periodic reviews.[1] Professor Sorsby finds that registrations of blindness increased by over 7000 between March, 1952, and the end of 1954. This increase is accounted for mainly by blindness in those aged 70 or over; in 1954, 69% of those newly registered as blind were in this age-group. Accordingly there has been a steady increase in the proportionate incidence of blindness due to senile macular degeneration. There has also been some increase in those aged 1–4 and 5–15. Retrolental fibroplasia is the cause of blindness in more than half of those aged less than 1 and rather more than 25% at ages 1–4. (The geographic distribution of retrolental fibroplasia is uneven: "It would almost seem as if there is a central island area in the country with a low incidence.")

As regards prevention, cataract is the one important cause where fuller exploitation of existing measures should help to reduce the incidence of blindness. Among the new registrations in 1951–54, 84% of those with cataract had had no treatment. At registration many of these patients are old and frail, but they could probably have undergone operation comfortably and safely some years earlier. Of clinical developments, Professor Sorsby writes:

> "If the congenital and hereditary affections are included amongst the general medical disorders, some 80 per cent or more of the blind under 50 present fairly well defined problems in general medicine. Hope in these affections lies not in an expansion of the surgical facilities available, but in the creation of clinical units which can draw on the potentialities of both ophthalmology and general medicine, even if this involves some departure from the traditions of ophthalmology as an essentially surgical speciality."

DORMEZ-VOUS?

Is Frère Jacques restless? And does Cheselden stir a little in his grave? The era of lithotomy may be giving way to an age in which stones are dissolved by a method founded on logical chemical precepts. Since we reviewed[1] this subject Lagergren[2] has described his biophysical investigations of urinary calculi. His findings from the examination of 600 calculi by X-ray diffraction confirm those of earlier workers—namely, stones are not the simple affairs our clinical nomenclature implies. The stones he studied were composed of a complex mixture of eleven distinct crystalline substances, and in one stone a substance defying identification was observed: whewellite, weddellite, apatite, and struvite were common; but uric acid was relatively uncommon. Microradiography showed the distribution of the various substances within a stone: a stone might have a core of one substance surrounded by another; and in a laminated stone made up of different substances each lamella consisted of one component only—as though the chemical, and, therefore metabolic, factors contributing to its growth changed during its existence. Such studies, together with an understanding of the architecture of a stone, as revealed by microradiographs, provide the proper foundation for treatment, since exploration of the biochemical processes involved in the formation of stone cannot possibly begin until it is known what stones are.

Even with our knowledge as it stands today we use chemical methods in an attempt to prevent the recurrence of stone formation—by decreasing the crystalloids in the urine, by preventing with hyaluronidase their aggregation or increasing their solubility by acidification or alkalinisation, as the case may be: or by preventing the absorption of phosphorus from the alimentary tract. Treatment on these lines is, however, a severe imposition on the patient, who has either to maintain permanently an unpalatable diet or continue to swallow unpleasant aluminium gels. Furthermore, each remedy is specific for what is thought to be the substance of the stone, within the crude and erroneous categories of oxalate, urate, and phosphate. And what practising urologist today has sufficient technical assistance to discover the nature of the core of a patient's stone? The substance at the core is of primary ætiological importance since it may differ

1. Ministry of Health: Blindness in England, 1951–54. Report by Arnold Sorsby. H.M. Stationery Office. Pp. 53. 3s. See also *Lancet*, 1953, ii, 981.

1. *Lancet*, 1955, ii, 1177.
2. Biophysical Investigation of Urinary Calculi. By CURT LAGERGREN. Stockholm. 1956. Sw. Kr. 25. *Acta radiol., Stockh.* suppl. no. 133.

from the cortex and thus provide the clue to the initial metabolic disturbance. The method of attack advocated by Prien and Walker [3] has much to recommend it. Apatite (basic calcium phosphate) is the commonest substance in urinary stones; moreover, half those stones which are predominantly calcium oxalate are found to have formed around a small nucleus of calcium phosphate. In its detoxicating function, glucuronic acid is excreted as a glucuronide in conjunction with the substance to be eliminated; by giving salicylate the glucuronide content of the urine is increased, and glucuronides increase the solubility of calcium phosphate, in proportion to their concentration. Prien and Walker have given both acetylsalicylic acid and salicylamide with good results to 19 patients subject to recurrent stone, with effective suppression of stone formation in 17; the encrustation of indwelling catheters was also prevented thereby.

Here, then, is a biochemical approach to treatment which commits the patient only to a familiar pill. It is not inconceivable that solution of stones already formed may eventually be achieved along these lines. So Dr. Whyatt [4] and Joanna Stephens may yet have the last laugh over the lithotomists. Their principle was correct, though the effective solvent is unlikely to be lime water and soap or a concoction of calcined snails, the seeds of wild carrot and burdock, hips and haws, all burnt to a blackness and mixed with soap and honey.[5]

A FURTHER OUTBREAK

THE return (announced in the *Times* of June 21) of the infection which appeared about the same time last year, and led to the closure of the Royal Free Hospital for several months, raises questions which were left unanswered by the group of articles which we published on May 26, dealing with what seems to be the same disease. The full report of last year's outbreak—which affected all grades of the Royal Free staff (residential and non-residential, medical and non-medical) but left the patients virtually unscathed—is eagerly awaited for any light it may throw on ætiology and length of incubation period. From the available evidence the incubation period seems to be not longer than a week; but we do not yet know whether a patient who has a relapse (as many have done) regains infectivity in the process.

The resemblance to encephalitis lethargica in a mild form is too striking to be ignored: after an initial period characterised by malaise, nausea or vomiting, somnolence, and slight fever, accompanied in most cases by ocular manifestations such as diplopia and nystagmus and occasionally by otitic symptoms such as tinnitus, neurological features appear in a varying proportion—some transient, others lasting months or even years. Emotional lability with hysterical symptoms is a conspicuous feature of severe cases, making the diagnosis difficult in the absence of specific diagnostic tests. At present electromyography serves to distinguish the condition from hysteria on the one hand and paralytic poliomyelitis on the other. It would be interesting to know whether cases diagnosed as poliomyelitis with spasm are not in reality examples of it.

The fact that 11 cases came to light at one fever hospital last year during the period when poliomyelitis was prevalent suggests that the infection may have been widely scattered in the community. Other London hospitals are also known to have had cases among their nurses, though none had an outbreak with the same "explosive" character as the Royal Free. From last year's experience, and the presumption that many of the staff have acquired immunity, one might expect that the present outbreak there will be promptly checked. Acquaintance with this disease, however, confirms its elusiveness; and probably most of the nurses and many of the domestic and clerical staffs have changed in the interval. In the modern hospital, doctors seem to be the most stable section of the population.

TREATMENT OF VOLKMANN'S CONTRACTURE

THE stigma which was so long attached to Volkmann's contracture still sticks, though it is now sixteen years since Griffiths [1] made it clear that the condition is in fact due to traumatic arterial spasm and that the application of overtight plasters and splints is seldom more than a minor contributory cause. Rarely does the surgeon have the opportunity of exposing the damaged artery and attempting to relieve the spasm before irreparable damage is done to muscles and possibly nerves; more often he is faced with the resulting paralysis and contracture. The attack on this problem has recently been intensified and more radical methods of treatment have yielded gratifying results.

For many years treatment was directed solely towards correcting the flexion deformity of the wrist and digits. In its simplest form this consisted in applying some form of splint to stretch the contracted muscles slowly but forcibly. Except in the milder cases, the deformity rapidly recurred after the splint was removed. Various operations, such as the muscle-slide operation of Max Page or some form of bone-shortening, such as carpalectomy, were rather more successful. But the contracture and the deformity it produces are merely signs of massive ischæmic necrosis of the affected muscles, and these methods of treatment could not be expected to restore their contractility. At best the patient was enabled to take advantage of the trick action in which active dorsiflexion of the wrist naturally produces some degree of flexion of the digits.

Recognising this defect of all previous operations, Parkes [2] took advantage of this trick action and restored a really useful range of flexion by transplanting one of the active extensors of the wrist into the tendons of flexor digitorum profundus, all the useless contracted tendons having previously been divided at a higher level to overcome the deformity. A great advantage of this transplant is that the patient needs no re-education; the transplanted unit naturally contracts with the remaining dorsiflexors of the wrist, and the summation of the effects of the trick action and the action of the transplant gives a good range of flexion of the fingers.

Seddon [3] has recently described an even more radical method in which the aim is to excise the whole of the infarct before restoring flexion by transplanting an active tendon. This enables him to assess the degree of ischæmic damage to the median nerve, and when spontaneous recovery seems unlikely he excises the whole of the ischæmic portion. Continuity is then restored either by a free graft, using that portion of the median nerve at the elbow which originally innervated the long flexor muscles of the forearm, or, in cases where both median and ulnar nerves have suffered extensive ischæmic damage, by an ulnar-to-median pedicle graft, as described by St. Clair Strange.[4]

There has undoubtedly been a considerable advance in the treatment of this crippling deformity. Naturally each patient requires careful assessment before operation, the timing of which is also important. In the less severe cases where the deep forearm muscles bear the brunt of the ischæmia, the remaining function in the flexor sublimis can be transferred to the tendons of flexor profundus after division of the profundus at a higher level. When all the flexors are involved but the median nerve is functioning, Parkes's method gives an excellent result so long as the

3. Prien, E. L., Walker, B. S. *J. Amer. med. Ass.* 1956, **160**, 355.
4. Works of R. Whyatt. Edinburgh, 1768; p. 337.
5. Clark-Kennedy, A. E. Stephen Hales. London, 1929; p. 127.

1. Griffiths, D. L. *Brit. J. Surg.* 1940, **28**, 239.
2. Parkes, A. *J. Bone Jt Surg.* 1951, **33B**, 359.
3. Seddon, H. J. *Ibid*, 1956, **38B**, 152.
4. Strange, F. G. St. C. *Brit. J. Surg.* 1947, **34**, 423.

extensors of the wrist have full function and the tendon transplant can be kept well away from the area of severe ischæmia. In the worst cases with necrosis of the median nerve, Seddon's more radical methods offer the best hope of restoring recovery.

There remains the problem of the paralysis of the intrinsic muscles of the hand which may result from ischæmia of the ulnar nerve. Parkes is at present working on a method in which the inert tendons of flexor sublimis are used to act as check ligaments to minimise clawing of the fingers, and this may well prove to be a further useful contribution to the reconstructive surgery of established Volkmann's contracture.

ADRENOCORTICAL FUNCTION IN PHYSIOLOGICAL STRESS

PATHOLOGISTS have long known that changes in certain organs are common to a great many different diseases. Conspicuous examples are the atrophy of the thymus and the loss of adrenal lipids in children dying of septic and toxic diseases. The first to formulate a definite non-specific syndrome common to many diseases was probably Widal,[1] who described the "hæmoclastic crises" characterised by a postprandial leucopenia in diseases of the liver; he compared it with the "shock-like" drop in circulating leucocytes after injection of foreign protein and with similar phenomena in paroxysmal hæmoglobinuria and allergic and infectious diseases. A more detailed description of unspecific hæmatological changes came from the work of Arneth [2] and particularly of Schilling,[3] who established the biological leucocyte-curve common to many infectious diseases. He distinguished three phases: (1) the neutrophil battle phase with neutrophil shift to the left and eosinopenia; (2) the monocytic phase of resistance; and (3) the lymphocytic-eosinophilic phase of recovery. About the same time, a series of investigations originated in the observation that various acute febrile illnesses had a beneficial effect on entirely unrelated pathological processes. Two familiar examples are the regression of Hodgkin's disease and nephrosis during measles. Weichardt [4] studied the effects of parenteral administration of proteins, and he referred to a general activation of the protoplasm including its enzymes.[5] Wagner-Jauregg reported remissions in general paralysis of the insane after injections of tuberculin, and this observation led to malaria therapy.

There followed Selye's work [6 7] on the alarm reaction, the general adaptation syndrome, and diseases of adaptation resulting from the derailment of a physiological defence mechanism. He claimed that a great many very different stresses produced in laboratory animals an involution of the thymico-lymphatic apparatus and an enlargement of the adrenal cortex, with an increased discharge of cortical hormones in addition to liberation of adrenaline. Since cortical extracts, cortisone, or corticotrophin (A.C.T.H.) also produce atrophy of the thymus and lymphatic tissues, and since hypophysectomised animals show neither enlargement of adrenals nor thymico-lymphatic atrophy when exposed to stress, these observations suggested that the pituitary received the primary stimulus and that the adrenal was the central organ of the general adaptation syndrome. Much time was devoted to histological and histochemical changes in the adrenals in unspecific stress, and attempts were made to assess the functional state of the adrenal cortex in such conditions. Selye's ideas stimulated thorough and often critical investigations, particularly of the histological and histochemical aspects.[8–13] Much work has been done on the distribution and identification of cortical lipids, phosphatases, and dehydrogenases. But the attempts to identify ketosteroids were sternly criticised by Boscott and Mandl.[14] Depletion of the adrenal cortex of lipids was made the basis for conclusions no less dogmatic than the opposite assumption of old pathologists that adrenals with abundant lipids were hyperactive and those with depleted lipids were exhausted. Depletion of lipids may be due to rapid discharge, to exhaustion of enzymes necessary for their synthesis, or even to irreparable degeneration. There are hopes that simultaneous estimation of lipids and of enzymes of the Krebs cycle, such as succinic dehydrogenase, may lead to more conclusive results.[15]

In clinical investigations, too much significance has been attached to the Thorn test, on the assumption that lymphopenia and eosinopenia is clear evidence of increased cortical function. It has been shown, however, that adrenaline produces eosinopenia in adrenalectomised animals sustained by cortisone.[16] Moreover, a stressor which evokes discharge of adrenaline will influence the white-cell picture by vasoconstriction and by direct action on the target organs—two effects which do not run parallel.[17] Similarly, increased urinary output of 17-ketosteroids need not indicate adrenal hyperfunction, since, in the adult male at least, their main source is the testis. Investigations are therefore welcome in which the effects of stress have been carefully compared with those of corticotrophin. Such investigations have been carried out for several years in Boston by a large team of workers, including clinicians, endocrinologists, pathologists, psychiatrists, and statisticians.[18–20] Members of a college boat-racing crew were studied during a four-mile race, during the intensive preparation and test trials, and on control days. The subjects examined also included coxswains, a crew manager, students presenting a clinical case for the first time, candidates for a PH.D. degree, and a mixed professional group during the showing of a documentary film of primitive tribal rites. The inquiry also included an untrained man who took part in a three-hour 17-mile run, 4 patients with Addison's disease during exercise, and a patient with bilateral adrenal cortical hyperplasia. Eosinophil-counts and estimations of 17-ketosteroid, 17-hydroxycorticoid, and uropepsin excretion [21] were carried out. Psychological tests included the Rorschach test and thematic tests in which the imaginative response to pictures is evaluated. In most cases the physical and psychological stress resulted in a drop in the eosinophil-count, and an increase in the urinary excretion of 17-hydroxycorticoids, 17-ketosteroids, and uropepsin; but in several cases there was a discrepancy between the drop in the eosinophil-count and the rise in urinary 17-hydroxycorticoids. Loss in the sweat was suspected but excluded. Sometimes the drop in eosinophils was the only positive test. The excretion of 17-hydroxycorticoids was increased during the race, but not on practice days which involved an equal amount of muscular activity. It seems that, in trained persons at least, psychological factors are more important in cortical stimulation than muscular work.

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Public Health

AN OUTBREAK OF TYPHOID FEVER ASSOCIATED WITH CANNED OX-TONGUE

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IN December, 1954, an outbreak of typhoid fever, in which the vehicle of infection was apparently a can of ox-tongue, occurred in a market town with a population of 4150 in the North Riding of Yorkshire. Because of the presence of influenza virus-B infection in the area and because of the treatment of the patients with chloramphenicol in the belief that they had influenza, in the earliest cases typhoid fever was not diagnosed until more than five weeks after the onset of symptoms.

The Cases

33 persons, 21 females and 12 males, aged 14–76, were affected: 30 had symptoms of typhoid fever; 2 were symptomless excreters; and 1, who had no illness and from whom *Salmonella typhi* was not isolated, had agglutinins suggesting recent typhoid infection. Of the 30 clinical cases 10 were confirmed by the isolation of the epidemic strain—*Salm. typhi* Vi phage type E1—16 were confirmed serologically, 2 had a clinical illness like typhoid fever but were not investigated in the laboratory, and 2 had an illness similar to that of many of the other patients and lived in houses where there were confirmed cases of typhoid fever, but their serological findings were not typical, and *Salm. typhi* was not isolated from their urine or fæces.

23 cases were primary and 4 secondary. 3 cases may have been infected primarily or secondarily.

The presence of typhoid-H agglutinins in persons with no history of inoculation with T.A.B. vaccine was considered to indicate infection with *Salm. typhi*. All those included had typhoid-H titres of 1/160 or higher, though the first serological examinations were in most instances made about nine weeks after the onset of symptoms. Typhoid-H titrations are not usually considered to be of diagnostic value in persons who have been inoculated with T.A.B. vaccine (Felix 1924) because of the possibility of anamnestic rises in H titres during non-specific fevers. The typhoid-O response, however, is regarded as specific, though it is impossible to distinguish typhoid from paratyphoid-B fever by this titration, because of the somatic factor 12 which is common to the two organisms and produces agglutinins in both diseases. For the sake of completeness typhoid-H as well as typhoid-O titres are given in the following details of 5 persons who had had T.A.B. inoculation.

	Typhoid-H titre	*Typhoid-O titre*
3 patients	1/640	1/320
1 patient	1/320 and 1/160	1/320 and 1/80 ten days between examinations
1 patient	1/50 and 1/10	1/10 and 1/250 fifteen days between examinations

The following is a typical case:

A man, aged 26, felt unwell on Dec. 17 and went to bed next day with shivering and headache. During the following week he had pyrexia, prostration, and insomnia. On Dec. 22 he had severe epistaxis, and a general practitioner was called. The patient's temperature was then 101°F, but he was comfortable and had no abdominal pain. He was treated with analgesics, and his temperature returned to normal. On Dec. 27 his temperature was again raised, he complained of pains in his chest, and he became delirious. Chloramphenicol 0·5 g. six-hourly was given from Dec. 29 for five days. He then felt much better, and his temperature became normal, but he felt weak and still needed rest in bed on Feb. 1, when his serum gave titres of typhoid-H 1/640, typhoid-O 1/640. He had never had T.A.B. vaccine, and eight fæcal and four urine specimens taken between Feb. 3 and Feb. 15 were negative.

4 patients died. 2 of them were a man and his wife, both aged more than 70, who died before the outbreak was recognised and had undergone no laboratory investigation. The man had had abdominal pain, distension, vomiting, and constipation, and died at stool thirteen days after the onset of his illness. The woman, who had a previous hemiplegia, developed headache, prostration, and delirium, and died after a severe intestinal hæmorrhage the day after her husband. A woman who nursed the couple and a man who ate food prepared in the house both developed typhoid fever. The other 2 fatal cases were confirmed bacteriologically. 1 was a woman, aged 72, with chronic congestive heart-failure, who died two months after the onset of the typhoid fever. The other was a man, aged 53, who died seven weeks after the onset of his illness following an operation for intestinal perforation.

Date of Onset of Symptoms

Although typhoid fever was not suspected until the fourth week in January, the first patients became ill on Dec. 17. Between that date and Dec. 31 all 23 cases considered to have been primary had developed symptoms (see table). Infections with influenza virus B, which were confirmed serologically, were prevalent just before and during the early part of the typhoid outbreak, and nearly all of the first 23 patients with typhoid fever were treated with chloramphenicol for five to ten days as cases of severe influenza. It was only when some relapsed after treatment and a complete laboratory investigation was made that typhoid fever was diagnosed.

DATES OF ONSET OF THE 23 PRIMARY CASES

—	Dates of onset (December, 1954)														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
No. of cases	4	5	3	5	2	1	1	1	–	–	–	–	–	–	1

Affected Households

The 25 persons thought to have been primarily infected—23 with symptoms and 2 without symptoms—came from sixteen households. 1 of the patients arrived in the town on Dec. 2, another was there only from Dec. 8 to Dec. 16, and a 3rd was there only from Dec. 11 to Dec. 15. It therefore seemed probable that infection took place in the first two weeks of December, and the dates of onset suggested that the patients might all have been infected on the same day.

Fourteen households were supplied with chlorinated water from the town supply, and two from another chlorinated source. The sixteen households obtained milk from five different retailers, and there was no pooling or holding of milk among the suppliers. There were no common supplies of butcher's meat, cakes, ice-cream, or bread. Groceries were obtained from two shops in the market place. The only common factor found was that in all sixteen households tongue or ham had been purchased from the same grocery shop in the first two weeks of December. Eight households bought tongue only, seven bought tongue and ham, and one ham only.

A family who bought tongue and ham on Dec. 11 clearly remembered details of the purchase. The wife was a part-time employee at the grocery shop concerned;

her duty was to make up orders for delivery. Having a cold on Dec. 10 she stayed in bed on Dec. 11 and arranged for her mother to come from a neighbouring town and look after her from Dec. 11 to Dec. 15. On Dec. 11 her husband bought the last 1/2 lb. of a can of unsliced tongue and some sliced ham. The wife ate all the ham but only tasted the tongue, which was eaten by her husband and mother on Dec. 11 and 12. Her husband and mother developed typhoid fever on Dec. 17 and 20 respectively, while she was unaffected.

The housewife who bought only ham bought it on Dec. 11. She ordered 1/4 lb. of tongue, which was sliced with a knife, wrapped in grease-proof paper, and weighed. Meanwhile she found that ham was considerably cheaper than tongue and asked the grocer to give her 1/4 lb. of ham instead. The ham was cut with the same knife. It was eaten by 3 persons for lunch on the day it was bought: 2 of them ate a small amount and were unaffected; but the 3rd, who ate most of it, developed typhoid fever twenty days later. In this case there was an opportunity for contamination of the ham from the tongue by the use of the knife used for slicing both products.

Tongue was bought every Saturday in December by nine households: three bought it only on Saturday, Dec. 11, and three bought it in the first two weeks in December but could not remember the exact date. Tongue was therefore a common factor among all the patients but one, and this patient ate ham which may have been contaminated by a knife from the tongue. The evidence suggested Dec. 11 as the date of infection. In some enteric-fever outbreaks the occurrence of gastro-enteritis soon after the time of infection helps to confirm the date of infection, but in this outbreak none of the affected persons had had any gastro-intestinal illness in the four weeks preceding their enteric illness.

The Ox-tongue

The tongue sold on Dec. 11 came from one 6-lb. can and was bought by a score or so of households, the average quantity purchased being about 1/4 lb. Typhoid fever developed in fifteen of these households. The high proportion of affected households indicates that the tongue must have been extensively contaminated.

The grocer was certain that tongue was never left over from one day to another, and that there was no possibility that tongue from a can opened on Dec. 10 had been sold on Dec. 11. The can sold on Dec. 11 was opened in the shop on Dec. 11 by the grocer and was of normal appearance, taste, and odour. It was the custom to slice part of the tongue on the bacon-slicing machine ready for the earlier customers, and this may have been done on this day. The remainder was cut with a knife for each order. The knife was also used for slicing ham and sometimes for cutting up packs of sausages, but sausages were usually sold packed, and on many Saturdays the knife was not used for sausages at all.

Inquiries were made in the factories producing the ham and the sausages sold on Dec. 11, but there were no findings to suggest that either of these foods was contaminated.

The Food Handlers in the Shop

On Saturday, Dec. 11, three men and one woman in the shop may have handled the tongue. One man had been in France in 1914 but gave no history of a typhoid illness. Serological and bacteriological tests on him and his family, including sewer swabs in the drains of his house, were negative. In the case of another man, who had never been out of the country, similar tests were negative. The third man and the woman, his daughter, had eaten tongue, but not ham from the shop for luncheon on Dec. 11. Serological examination and the examination of this man's urine and fæces were negative. His daughter however, became ill on Dec. 17, went to bed on Dec. 18, and next day had nausea, slight diarrhœa, thirst, insomnia, and rigors. She was treated with chloramphenicol 0·5 g. six-hourly for ten days; her temperature became normal on Jan. 3, 1955, and she was convalescent on Jan. 9. She had never had T.A.B. vaccine. The agglutination titres of her serum on Feb. 12 were typhoid-H 1/640+, typhoid-O < 1/10. Nine specimens of fæces and five of urine did not yield *Salm. typhi*. She is considered to have been a victim of the outbreak.

The Can

All the evidence therefore suggested that the can was contaminated before being opened in the shop. It was manufactured overseas and had been packed in June, 1954, and shipped in July. It was of double-seam soldered construction with cap and bridge. The top collar and bottom of the can were double-seamed on to the body flanges, which had been pre-dipped in solder. After double-seaming heat had been applied to the seams to sweat the solder and to make a complete seal. This method of construction reduced the risks of leakage to a minimum (T. E. Bashford, personal communication). However, small self-sealing leakages can develop in a small proportion of such cans, and these leaks may allow the entry of a drop or two of fluid before resealing takes place (Townsend and Esty 1939, Braun 1953). In these circumstances no change may be noted in the partial vaccum in the can. Leakage is most likely to take place when the cans are being cooled in water at the end of the canning process.

The Canning Factory

The suspected can was one of 35,000 produced in the same factory in 1954, and no complaints about other cans were received by the producers. The factory was situated on the bank of a deep fast-flowing river. Two supplies of water were used in the factory. Both were drawn from below the surface of the river downstream from the outlet of the city sewage-treatment plant. One supply was filtered and chlorinated, and the other was untreated. The untreated water was used for cooling the sealed cans in the retorts at the end of the canning process. Treated water was used for all other operations in the factory. After cooling, the cans were washed and then incubated at 92°F for fifteen days before they were labelled and shipped.

If the can was contaminated in the factory, contamination probably took place during the cooling process, in which untreated water was used. Sandiford (1954) isolated *Salm. typhi* from a can of cream, but two hundred and twenty-five other cans of the same batch were negative. These cans had been cooled with water from a contaminated source. However, with the type of can we have described, the possibility of leakage and the chances of examining a contaminated can are slight. Only two unopened cans of tongue of the same batch were investigated. They were examined by the Food Hygiene Laboratory and were found to be sterile. The cans were sound.

Discussion

The use of untreated river-water for cooling cans in the retorts at the canning factory suggests, even though the cans were of double-seamed construction, that the most probable source of contamination was in the factory, but there can be no certain proof of this. Sandiford (1954) showed that a similar state of affairs occurred with canned cream, but it must happen rarely. A contaminated can might pass through the incubation test if it contained only non-gas-producing organisms, and *Salm. typhi* does not produce gas. The risk that a can will leak momentarily and in that moment will absorb an enteric non-gas-producing pathogen must be

infinitesimal, and complete proof of its occurrence is almost impossible to obtain because only one in some thousands of cans is likely to be affected. On general principles, however, it seems unwise for canners to use potentially contaminated water for their cooling processes.

In the past twenty years there have been four outbreaks of typhoid fever associated with meat.

In 1938 there were two such outbreaks, each affecting seventeen to twenty households (Ministry of Health 1938). Both were connected with grocery shops selling cooked canned meats, and the vehicle was thought to have been food, but no particular food was suspected. In one shop the staff were negative bacteriologically and serologically, and in the other a girl who did the cleaning had a high content of antibody in her serum, but there was no evidence that she was a carrier.

In April, 1948, an outbreak due to *Salm. typhi* Vi phage type E1 at Crowthorne, investigated by Moore (1949), affected 41 persons. The vehicle was thought to have been canned corned beef, and no carrier, symptomless excreter, or other source of contamination of the meat after the can was opened was found.

Peters and Clutterbuck (1942) described a typhoid outbreak in Glasgow where 35 persons were affected and where meat was suspected of being the vehicle of infection. No particular meat was common to all the primary cases, but the shop sold a high proportion of canned and processed meats. A month after the suspected date of infection the butcher became ill with typhoid fever.

Summary

An outbreak of typhoid fever due to *Salm. typhi* Vi phage type E1, affecting 33 persons, is described. Except for 1 woman, who ate ham which seems to have been secondarily contaminated, the primary cases were in patients who had eaten ox-tongue from one 6-lb. can.

The can of tongue was probably contaminated in the factory, after processing by sewage-polluted river-water used for cooling.

The outbreak was unrecognised for five weeks because of a simultaneous outbreak of influenza B and the wide use of chloramphenicol.

We wish to thank Dr. E. S. Anderson and the staff of the Central Enteric Reference Laboratory and Bureau for Vi-phage typing; Dr. H. G. M. Smith, of Bradford, for the influenza complement-fixation tests; Dr. Betty Hobbs, of the Food Hygiene Laboratory, for the examination of food and water; Mr. T. E. Bashford, of the Metal Box Company, for the examination of cans; Dr. N. J. Hessian, of Yearsley Bridge Hospital, for details of his cases; and Dr. Kenneth Froome, of Scarborough Hospital, for some bacteriological results.

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DETERGENTS

A committee was appointed three years ago by the Minister of Housing and Local Government to examine and report on the effects of the increasing use of synthetic detergents and "to make any recommendations that seem desirable with particular reference to the functioning of the public health services." Its report[1] contains a wealth of technical information which will be useful in the management of public waterworks and sewage-disposal plants, and it also covers many aspects of the problem which are of topical popular interest.

The use of these household washing-powders does not seem to have led to any significant increase in the incidence of dermatitis in housewives and laundry-workers. Even in normal concentrations, however, they are capable of causing dermatitis in the susceptible, and the risks are increased if they are not used in a sensible way. Similarly they can have a deleterious effect on certain types of domestic plumbing. If the housewife could strike a balance between sales resistance and casually extravagant use of detergents, a lot of interests at the other end of the sewer would feel much less anxiety.

When crockery is slipped, without rinsing, from the foaming sink to the labour-saving drying-rack, some traces of synthetic detergent inevitably remain to be swallowed with the next meal. Whether this is harmful, and if so how the risk compares with those attached to cigarettes, diesel fumes, radioactive fall-out, and the bizarre chemicals nowadays sprayed on our crops, remains to be discovered. The committee says that long-term study is needed to see whether there are any ill effects.

The production of massive foam at sewage-works is more than an embarrassment to the operators and a detriment to the purification process; the sewage-contaminated foam is liable to be picked up by the wind and blown across the countryside, which is not only unpleasant but a danger to public health. Foaming extends into many of our main rivers and adds fresh hazards to the life of fish, which are already battling (for survival and oxygen) with sewage and industrial wastes. When the same river becomes the public water-supply to downstream communities, the problem returns to the housewife.

A majority of the committee fear that conditions may deteriorate, and recommend the Government to consider whether control powers should be prepared in advance. Four members, however, contend that the difficulties are being exaggerated, and hold that in any case the public-health authorities ought to be clever enough to find the remedy. Unfortunately the report does not disclose whether or not the four optimists happened by any chance to be the four representatives of the trade interests involved. We like to know such things.

1. H.M. Stationery Office. 1956. Pp. 60. 3s.

WESTERN EUROPEAN UNION

As a result of administrative arrangements which have just come into force, the member States of Western European Union now form a single territory for health control of sea and air traffic, thus extending the scheme operated by the five-power Brussels Treaty Organisation.

Under the new arrangements, health-control regulations at airports no longer apply to aircraft coming from any of the seven countries of the Union; and the maritime declaration of health is no longer required from vessels of member countries plying only between those ports of the seven countries included in the scheme.

An information exchange service has been organised so that the health authorities in member countries can keep in constant touch and can supply each other with information about all disease covered by international health regulations, or any epidemiological incident which would be of interest to the other countries.

OCCUPATION CENTRES FOR THE MENTALLY DEFECTIVE

"The nurturing and training of mentally defective children in occupation centres is one of the most important and useful activities of a local health authority." Dr. R. W. Elliott, medical officer of health for Bolton, expresses this view in his report for 1955. But, he adds, Bolton's centre deals only with those up to the age of sixteen, and there is an overwhelming need for the centre to be extended so that all age-groups can be constantly guided and trained, to prevent social deterioration. "All the excellent training which has been given before the age of sixteen years is completely nullified if at that age they have to leave us and become once more flotsam tossed about on the sea of life."

The Casualty Department

III. A COMPREHENSIVE ACCIDENT SERVICE*

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THE previous articles have described how the reception of emergencies, the disposal of accident cases, and the treatment of diverse minor conditions whose only common feature is that they are ambulant, are gathered into one department of the hospital. This association has grown fortuitously, mainly because the arrival of all these patients is unpremeditated, but partly also because the disposal of accidents is only now, and only to a limited extent, being separated from the disposal of other emergency cases.

Most of the country is so populated that only a few large cities can support a system where all accident cases, major and minor, can be dealt with at a centre whose periphery has a conveniently short radius. Many industrial areas of 150,000–300,000 inhabitants cannot afford to provide for themselves a comprehensive system with fracture clinics, general surgical wards, head injury and burns units, and a staff to give a 24-hour cover. The problem cannot be solved by making the largest casualty department the centre and closing down the rest, because this would reject very many of the minor injuries. The question arises, on the other hand, whether it is necessary for every hospital to have a complete casualty department, and whether a redistribution of its three main functions could not make for greater efficiency and improved clinical results.

If the medical and surgical emergencies which are to be considered for admission are assessed by the inpatient staff, their reception and early treatment pass at once into the hands of those who will follow their definitive treatment. In many hospitals this system is already in operation, and the casualty officer's function is often confined to informing the R.S.O. or R.M.O. of their arrival. In very large hospitals admissions are so frequent that it is an advantage to have someone whose main duty is to receive them, but in smaller ones there seems to be no valid objection to a system where the inpatient houseman is called to see the case he will very soon have to examine anyway, and there would be advantages in him carrying out examinations in the privacy of an admission-room instead of after admission to the ward. Putting responsibility for these cases upon the senior resident staff of the receiving hospital, and for accident cases on the accident service, would distribute among a number of doctors a medicolegal responsibility which is becoming too much for a single junior to bear.

More of the "sorting-house" work can be avoided, if cases are referred direct to their special clinics instead of through the casualty department. Radiological diagnoses should be made in the X-ray department, general-practitioner work should be referred to the family doctor (now that everyone has a doctor), minor specialist procedures in such departments as E.N.T. and skins should be done in the departments concerned.

If an accident service could be organised in areas with a twenty-mile radius, most of the remaining casualty work in all the related hospitals and clinics could be associated with it under centralised supervision but without bringing every patient to the centre itself.

* The last of three articles dealing with some of the difficulties facing casualty departments of non-teaching hospitals and outlining a scheme for a more comprehensive accident service.

The Outposts

A perfect accident service starts at the accident itself; and a system of outposts, closely associated with a central hospital, would avoid calling every minor case to the centre. Many such outposts in the industrial medical service, the medical units of nationalised industries, the school medical service, and the outpatient departments or casualty rooms of the smaller hospitals have an independent existence already. If the treatment of thousands of cases seen in these units can be integrated with the casualty department in a central hospital, a great step forward will have been made—and at the same time a mechanism will have been created for the more rapid and accurate reference of major accidents to their proper place of treatment.

Those who have acquired extensive experience in the management of acute injuries would be the first to agree that orthopædic problems play much less part in it than is generally supposed. The treatment of shock, and of burns, the care of multiple injuries (especially the association of head injuries with injuries to other parts), problems of infection, plastic surgery, and special anæsthetic technique require an accident service that can call upon a team rather than an individual. It is important that an early decision should be made on whether such a team is likely to be wanted. The periphery of a casualty service must be capable of making such a decision with a high degree of reliability. All parts of it should have a clear idea of the type of definitive treatment likely to be given at the centre, so that first-aid, transport, and what has been called "second-aid," are in line with the treatment the patient will ultimately receive.

In this conception many of the smaller casualty departments, after being relieved of much of their responsibilities for the reception of inpatients and disposal of outpatients will cease to be part of the hospital in which they are housed. They will become representatives of the accident service, and fulfil a function similar to other accident service outposts in large industrial concerns. They will treat those cases which can be dealt with on the spot, and refer those which require attention at the centre. Their equipment can then be simplified, and in particular it will not be necessary for them to maintain outpatient operating-theatres. On the other hand, their facilities for administering first-aid and shock therapy, and for organising rapid reference of major accident cases must be considerably improved. They will be in constant communication with the main casualty department at the accident centre. They will always have power to admit cases to the hospital where they are situated if it is felt that further travelling will be dangerous for the patient.

The Centre

The central casualty department can cover an area of a thousand square miles. It needs consultant surgeons and must be able to provide a day-and-night medical cover. It also needs enough doctors for one to visit each of the outposts daily. Its establishment must include clerical assistance and the services of an adequate bacteriological laboratory. It will have complete control of a short-stay ward, and X-ray facilities devoted primarily to its own needs. It will have first call on the services of an anæsthetist. It will be situated in the same hospital as the inpatient accommodation for the accident service, and will work as part of that service. Its medical staff will be in constant touch with an emergency-bed bureau and the other receiving hospitals of the area. It will act as an information centre for all questions on the admission and disposal of urgent cases; its doctors will also be coördinating officers, and its senior doctor on duty will be in charge of casualty services

in an emergency with functions such as are defined in the Birmingham scheme.[4] The centre will provide a mobile team, such as is recommended for attendance at "major disasters."[5] The provision of a private telephone network with all its outposts should receive consideration.

Contact Between Outposts and Centre

No economy in medical man-power would be effected if it were proposed to staff each outpost, or even such outposts as are at peripheral hospitals, with a casualty officer. The majority of minor injuries seen in casualty departments can be treated effectively by an experienced nurse, and indeed many of them are so treated at the present time. A clinic held by a doctor once a day for reassessment and supervision will make it unlikely that any important complication is missed. One doctor can thus control five or six outlying clinics. Although immediate medical attention to every trivial complaint or injury would not be given, the total medical cover would be increased, because more establishments treating such conditions would be supervised by the accident service. The medical cover, furthermore, would have some continuity of direction and policy, and, one hopes, would be capable of making clinical advances.

Cases of acute superficial sepsis would be treated in their early stages at the outposts, but seen daily by the doctor "on circuit" who would decide when or if operation is indicated. He would be followed around by an ambulance which could pick up operation cases and take them to the casualty centre.

Injuries of a more serious nature, such as extensive lacerations or obvious fractures, would be referred to the centre. Major injuries would normally be taken there direct from the accident, but occasional cases would have to be "staged" at outposts for first-aid or even held at the peripheral hospital if unfit to travel farther. On such occasions the accident service should be prepared to send a doctor to the outpost; though every hospital, whether equipped to deal with accidents or not, should be prepared to hold those few cases which arrive unheralded and are obviously unfit to be transferred.

In this way the obviously trivial cases, which constitute 90% of the casualty department's work, are filtered off. The doubtful acquire medical cover promptly, and transport is burdened only with those who need it.

Most important of all, every outpost, whether situated at a peripheral hospital, a clinic, or an industrial concern, should be in constant touch with the casualty centre, so that advice is always available and the chances of error in disposal are reduced to a minimum. Every doctor in the accident service, from consultant to junior house-surgeon, should take turns in going "on circuit," so that he is continually reminded of the problems in the catchment areas. No accident service can regard itself as complete if it sits in a department and waits for its cases to be brought to it.

A working knowledge of the local authority's services (police, ambulance, fire brigade) and of other organisations, such as pit rescue-teams, first-aid societies, and N.H.S. reserve and Civil Defence Corps, and an active attempt to make them aware of the proper disposal of accident cases will do much to send the injured straight from the incident to their right destination. There must also be a free exchange of nurses between outposts and the casualty centre, so that they are made aware of any advances in treatment. The attendance of voluntary or local-authority employees concerned with the administration of first-aid should be encouraged. Industrial medical officers, having the care of a large number of workers, should be invited to bring their own first-aid posts into the scheme.

4. *Lancet*, 1955, i, 298.
5. *Ibid*, 1954, i, 1225.

The Staff

The Nurses

An accident service designed on these lines will depend very much on the ability of its nurses; and there is no reason why this should not be so. A properly trained nurse is as skilled a dresser, and as accurate at skin suture, as a doctor; and she commands, or can command, as much respect. If a nurse can be trusted to bring us into the world, she can be trusted to sew up our cuts. In many areas there is no difficulty in recruiting for part-time duties, though there may be scarcity in resident nurses. Such part-time nurses would appreciate the stimulus of close association with a medical centre; they would be proud to be members of its team, and they would welcome the opportunity to coöperate in the improvement of the medical services.

The Doctors

I believe that if one could offer young doctors membership of an efficiently organised and clinically satisfying section of the hospital system, with the prospect of teaching and support from more senior colleagues, there would be less difficulty in recruiting them for casualty posts. At present the casualty officer is very often left in isolation, and this should be remedied.

General practitioners should be brought into the service, not as stopgaps for a weak part of the hospital system, but with benefit to themselves and to the service. Many of the proposed outposts could be supervised by them, as part-time members of the staff; and arrangements could be made for them to attend at the central hospital as well, so that they can keep themselves up to date in this type of work.

SUMMARY

1. The work of casualty departments in non-teaching hospitals is reviewed.

2. Many difficulties arise from lack of continuity in medical care, from shortage of medical staff, and from the several unrelated duties that fall upon the casualty department.

These difficulties have only partially been overcome by enlisting the help of local practitioners, by appointing senior casualty officers, and by making consultants "responsible on paper" for the work of the department.

As a result there are serious shortcomings at present, both in the standard of medical care and in administrative efficiency.

3. A plea is made for the establishment of comprehensive accident services and a scheme for such a service is outlined.

It would consist essentially of a central casualty department—housed in a hospital with facilities to treat all major accident cases, either as outpatients or as inpatients—and of a number of outposts in close contact with the centre.

If the responsibility for receiving medical and surgical inpatients, for distributing outpatients to special departments, and for dealing with major accidents, were removed, the chief reasons for continuous medical cover in the smaller casualty departments would cease to exist.

Minor accident cases could be treated at the outposts by trained nurses under regular but not continuous supervision by doctors from the centre.

An efficient system would ensure the prompt transfer of all major cases to the central casualty department.

The requirements of such a centre are discussed; and particular stress is laid on the need for maintaining a general-surgical rather than a purely orthopædic character.

A closely knit accident service would allow its medical and nursing members to keep abreast of advances in treatment, and it would provide opportunities for

further improvements. It would help to solve problems which are at present created by a shortage of casualty staff, and ensure the more economical and more efficient care of patients both with trivial and with serious injuries.

I should like to thank many casualty officers and nursing sisters in my own and other hospitals who have given time (which could ill be spared) to show me their departments, to discuss these problems, and to produce most of the information.

Medicine and the Law

The Limits of Friendship

ON July 5, 1948, the Liverpool Radium Institute, formerly a voluntary cancer hospital conducting research as part of its work, was vested in the Minister of Health under the National Health Service Act, 1946. In September, 1948, people who before the vesting day had been associated with raising funds locally and in the North-west for the hospital, met to form a new unincorporated association, called the Friends of Liverpool Radium Institute. The agenda and minutes of the foundation meeting stated that the object of the new body would be "to enlist support for research and scientific and medical developments as well as additional comforts and amenities for patients." Appeals were made as before, a series of leaflets were distributed to the public, and at the date of these proceedings the funds of the charity amounted to £110,000; but in 1953 a divergence arose on the committee between those who thought that the object of the trust should be limited to activities connected with the institute itself and those who thought it extended to the wider use of the funds for cancer research generally or at least in the North-west area. To test the matter the committee resolved to make a payment of £800 to the University of Liverpool for a cancer research fellowship. The trustees of the fund then asked the Court for a ruling; and on Jan. 25, 1956, the Vice-Chancellor of the County Palatine Court of Lancaster made an order which in effect declared that the funds could be donated to the wider purposes. The institute appealed.

Lord EVERSHED, the Master of the Rolls, said that though the formation of the new body and the framing of its object and rules had been rather informal, the words stating the object in the "foundation documents," the agenda and minutes of the inaugural meeting, made it clear that in their context the objects were limited to those directly concerned with the institute. The minutes showed that the new body was to be a reconstitution of friends of the old hospital who would do for the hospital what the hospital as a nationalised institution could no longer do itself; the "comforts and amenities for patients" must be limited to patients of the institute; and the words "research . . . development" did not mean development throughout the United Kingdom or the world, but were limited by the title "Friends of the Institute," which was a cancer hospital. "Research and development" therefore meant "cancer research and development" logically including the institute.

His Lordship did not agree with the Vice-Chancellor who had held that leaflets issued to the public appealing for funds showed that the primary purpose of the association was to collect money for cancer research generally, for anyone who gave attention to the leaflets would see that they were an invitation by this body formed in September, 1948, whose object was that for which it had been founded.

The Court declared that the object was "for the purposes of cancer research and medical and scientific developments at, by, or under the direction of the Institute." The appeal should be allowed; and accordingly the resolution to devote £800 to the University of Liverpool for a cancer research fellowship was outside the scope of the powers of the trustees or the committee. His Lordship expressed the hope that this decision would end the local dispute, for these funds were subscribed to use and not to hold; but if the differences continued, the Attorney-General for the Duchy would no doubt apply for a scheme.

Lord Justice JENKINS and Lord Justice HODSON agreed.

Shields *v.* The University of Liverpool and Others.—*Court of Appeal:* Lord Evershed, *M.R.*, Jenkins and Hodson *L.JJ.* June 21, 1956. Sir Lynn Ungoed-Thomas, Q.C., and Joseph Turner (Whitley & Co., Liverpool); Lionel Edwards, Q.C., and W. Lyon Blease (Alsop Stevens & Co., Liverpool); William Geddes (Batesons & Co.); Attorney-General for the Duchy of Lancaster (E. Milner Holland, Q.C.), and Eric Griffith (Garnett, Tarbet, Lindsay and Ellsworth for the Solicitor to the Duchy).

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Special Articles

SOME HEART-MURMUR SIMILES

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THE quality of some cardiac murmurs is a key to their type and origin. Lewis years ago said that recognition of the presystolic murmur of mitral stenosis was analogous to the instant realisation that the bark heard was that of one's own dog. This statement implied two things: the difficulty of accurate description, and the necessity for listening so frequently to typical mitral presystolic murmurs that auscultatory diagnosis became automatic.

I have for some time, in teaching, used certain similes in the description of murmurs. A belief that such similes have been helpful is the stimulus for these few poetico-clinical remarks.

Diastolic murmurs, in rheumatic heart-disease, may be caused by aortic regurgitation or by mitral stenosis, and when differentiation between these seems difficult the quality of the murmur is often of great diagnostic value. The diastolic aortic murmur, heard best in most cases down the left sternal border and to the apex, has the high-pitched rushing and persistent quality of water escaping under pressure from a hose, over a weir, or from a leaky lock-gate. The diastolic murmur of mitral stenosis—not the presystolic—has the low-pitched rumbling quality of a wooden wheelbarrow trundled over cobble-stones. Either of these murmurs may be loud and easily heard or distant and elusive, but the weir may be distant too, and the wheelbarrow in the next garden but one. The quality of the sound is unchanged in both types of sound whether remote or near, bucolic or pathological.

A less rural simile is applicable to the forcible harsh, brief, systolic murmurs caused by the powerful ventricular expulsion of blood through a rigid and narrowed valve. Examples of this are found in aortic stenosis, pulmonary stenosis, and coarctation of the aorta. The sound here suggests the deliberate forceful and short blasts of steam given off by the Scottish express starting from rest at King's Cross. The sound may be heard from the other end of the station, or from farther off still, and may vary correspondingly in volume, but the character of both steam blast and murmur is very similar. When this same type of murmur is due to coarctation of the aorta it is naturally much fainter than in the other two conditions.

The so-called "machinery" murmur heard in many cases of patent ductus arteriosus again suggests the Scottish express, but this time the sound is that heard by

a passenger sitting in the train as it coasts downhill and with brakes off through the tunnels towards King's Cross.

The lub-dub of the heart sounds corresponds to the coupled sounds made as the carriage rolls over the joints between successive pairs of rails, and the roar of the tunnel mimics the continuous murmur of the lesion, but the windows are shut and the sound is not too loud. The roar seems to be intensified at each sound cycle, as the new pair of rails is reached, but this is an auditory fallacy. In the heart lesion the systolic accentuation of the continuous murmur is real and not apparent. The rhythm and the basic succession of sounds, in many cases of patent ductus recalls this picture, but here again the volume varies, in some cases being loud, in others moderate, and in yet others very distant.

Another sound—a rarity—heard when an aortic-valve cusp is severely ruptured, perforated, or perhaps even everted, as a result of syphilis or subacute bacterial endocarditis, is a diastolic croon. This murmur closely mimics the coo of a near by and rather hoarse wood-pigeon which has been restricted to one rhythmic falling note instead of the usual three or four. The murmur may be so loud as to be audible by the unassisted ear at a distance of several inches from the chest.

A final simile, this time from the dance-hall, is applicable to the friction rub of pericarditis.

The drum beat of a dance-band playing a two-step is a measurable fraction of time in advance of the shuffle of the dancers' feet upon a well-chalked floor. The double rub of the pericardial surfaces is similarly appreciably delayed behind the beat of the first and second heart sounds. Sometimes the rhythm of the friction instead of being to-and-fro is triple, and, to modify the metaphor, the dance becomes a waltz, not a two-step, the third sound of the triplet being caused by auricular systole. Once more it must be stressed that the quality and timing of the sounds are the important points. The volume varies. The shuffle of the dance may be quite loud, or if the ballroom door be shut may be heard only by close attention.

CONSULTANTS' CONFERENCE

A CONFERENCE of over 300 consultants and specialists, organised by the central and regional consultants and specialists committees, was held in London on June 20. It was the first conference of its kind, and it was attended by members of the central committee and by representatives appointed by regional committees. Mr. A. M. A. MOORE was in the chair. After a private session in the morning, the conference heard an address by Sir RUSSELL BRAIN, chairman of the Joint Consultants Committee.

THE DOCTOR'S POSITION TODAY

Sir Russell spoke of the present paradoxical situation in which the demand on hospital beds and outpatient departments was as great as ever, despite the striking medical progress of recent years which had enabled us to cure or control many diseases. There was still more work for more doctors. But, Sir Russell went on, the doctor could not get on with his job satisfactorily unless certain conditions were fulfilled. He must be free to do his work without interference on matters for which he was personally responsible. The task of the Government and all lay authorities was to create the conditions in which doctors could do their best work—"so far as possible, to give us the tools and leave us to get on with the job." Perhaps it was not generally realised, Sir Russell remarked, that this involved a new pattern of social organisation. State services were usually hierarchical; and in medicine we had to combine a State organisation with individual freedom. This was not an easy task, but Sir Russell believed we should succeed. He thought there was a need to emphasise that the doctor occupied, and must continue to occupy, a unique place in the Health Service. Medicine today was increasingly a matter of team work, but there must be a captain; and surely it was obvious that the more complex medicine became the more important it was that the responsibility for the patient should be in the hands of a single person—the consultant in hospital and the family doctor outside. We were grateful, Sir Russell said, for the help which a growing army of technical experts gave to medicine; but it was the doctor in charge of the patient who must always decide how their services were to be used.

When Parliament set up the National Health Service, it made itself responsible for the economic status of most doctors; and the present economic situation meant not only real hardship for those in the lower salary range but for all a deterioration in economic status relative to some other occupations, which, if we did nothing at all, might well be permanent. This had not happened as the result of anyone's design but as the by-product of other people's actions and unchecked economic tendencies. We faced here, Sir Russell declared, a challenge to the future of the profession. But we must not let the difficulties of the times blind us to what had been achieved. He believed that historians of the future would look back with astonishment at the establishment of the National Health Service between 1946 and 1956—a minor social revolution in which they would say, he hoped, that Britain, with characteristic wisdom, welcomed the new ways while conserving all that was best in the old.

HOSPITAL MEDICAL STAFFING

At the afternoon session, Prof. G. I. STRACHAN, chairman of the committee which reported last year on hospital medical staffing, told the conference that the plain fact was there were too many senior registrars. Barring some such scheme as his committee had suggested, there were no alternatives but other employment or, to put it bluntly, unemployment. The Joint Consultants Committee is now discussing this subject with the Ministry of Health; but, as the central committee's report puts it, "in view of the complexity of the problem early agreement is not to be expected."

Mr. G. WARING ROBINSON, chairman of the S.H.M.O.s' group executive committee, urged that there should be an expansion of the consultant establishment which should first absorb existing S.H.M.O.s. Most S.H.M.O.s, he declared, were now doing consultant work. A total of 10,000 consultants would not be too liberal an allowance for the population of this country; yet at present there were only about 6000 consultants and rather less than 3000 S.H.M.O.s. Mr. A. STAVELEY GOUGH emphasised that Professor Strachan's committee had had no intention of worsening the present position of the S.H.M.O.; but he called this motion an irresponsible one. It was nonsense to suppose that all S.H.M.O.s were doing consultant work. When Mr. Waring Robinson's motion was amended to read "absorb existing *suitable* S.H.M.O.s" it met with the conference's approval.

After discussing other matters dealt with in the Strachan report, the conference agreed to the following motions:

(1) "That this meeting is opposed to the introduction of any new career grade where the holders of such posts carry out work which should be carried out by consultants" (carried after a recount).

(2) "That in the event of the reforming of the structure of hospital medical staffing the grade immediately below consultant should be linked with the consultant grade and should be regarded as part of the senior medical staff."

(3) "That in any hospital restaffing the number of senior assistants should be strictly limited in order not to exploit the grade."

(4) "That, in view of the disparity in consultant establishments in various hospitals, a minimal standard of consultant staffing in relation to the number of hospital beds should be recommended."

MEDICAL ADVISORY MACHINERY

Dr. A. ROWLAND HILL, deputy chairman of the central committee, said the committee had consistently pursued its policy of seeking to improve the medical advisory machinery at all levels in the service. But the position was not satisfactory and he feared the domination of lay advice; hospitals, it seemed, had an attraction for those with a love of power. One proposal aimed at improving matters was put before the conference: the suggestion that there should be a medical advisory committee to each regional hospital board was approved. The majority of members of this committee should be elected by the consultants and S.H.M.O.s in the region.

MILEAGE ALLOWANCES

After considering the adequacy of the present car mileage allowances, the central committee decided that there was not a sufficiently strong case for seeking an improvement in the rates. But the conference disagreed and held that "in view of the increased rate of depreciation in car values and the need on grounds of reliability for consultants to maintain reasonably modern cars," the time had come for an increase in the mileage allowance.

POWER OF THE CONFERENCE

The conference was asked to say that resolutions passed by it and future consultants' conferences should be binding on the Central Consultants and Specialists Committee. Mr. T. HOLMES SELLORS, chairman of the committee, said the original idea was that the conference should be advisory and not policy-making; and he was reluctant to see that principle changed at present. The conference voted in favour of remaining an adviser.

CONSULTANT AND OTHER SPECIALIST STAFF IN HOSPITALS

THE Ministry of Health and the Department of Health for Scotland last year issued figures for consultant and other specialist staff in National Health Service hospitals up to the end of June, 1954.[1] These Departments have now carried the figures forward a further year.

In table I (not reproduced here) they show the age-distribution of consultants and senior hospital medical officers in each specialty and the number of paid sessions undertaken by those in each specialty for each year of birth.

Table II shows the number of consultants in each of the specialties year by year from 1949. The corresponding figures for S.H.M.O.s are not available.

Table III shows the number of senior registrars in each specialty on June 30, 1955, at the various levels of training.

1. See *Lancet*, 1955, i, 448.

TABLE II—NUMBER OF CONSULTANTS IN EACH SPECIALTY AT VARIOUS DATES SINCE DEC. 31, 1949 (GREAT BRITAIN)

Date	Specialty																					Total
	General medicine	Diseases of the chest	Mental health	Neurology	Paediatrics	Radiology	Radiotherapy	Physical medicine	Pathology	Infectious diseases	Dermatology	Venereology	Ophthalmology	General surgery	Anaesthetics	Neurosurgery	Plastic surgery	Thoracic surgery	Orthopaedic surgery	Ear, nose, and throat surgery	Obstetrics and gynaecology	
Dec. 31, 1949	755	216	449	53	166	327	85	49	495	50	127	89	331	927	496	37	30	49	252	312	424	5719
Dec. 31, 1950	821	250	504	53	202	378	93	57	526	52	136	101	341	943	602	39	32	57	269	328	439	6233
Dec. 31, 1951	857	266	532	59	208	400	101	61	541	48	135	99	342	948	655	42	33	66	293	341	449	6476
Dec. 31, 1952	904	310	566	61	214	414	108	70	581	51	142	97	351	986	714	44	36	81	320	339	473	6862
Dec. 31, 1953	905	340	595	67	222	436	112	75	631	60	145	94	342	982	748	46	43	89	328	346	473	7079
Dec. 31, 1954	924	344	616	68	226	447	116	74	646	59	146	93	340	987	782	48	48	91	335	350	485	7225
June 30, 1955	932	346	633	69	228	455	120	73	659	58	146	93	341	988	797	49	50	93	339	353	493	7315

Consultants practising in more than one specialty have been included under each. This table includes honorary consultants.

TABLE III—SENIOR REGISTRARS IN GREAT BRITAIN ON JUNE 30, 1955

Specialties	Training plan					Others*	Grand total	Specialties	Training plan					Others*	Grand total
	1st yr.	2nd yr.	3rd yr.	4th yr.	Total				1st yr.	2nd yr.	3rd yr.	4th yr.	Total		
General medicine ..	44	40	20	21	125	80	205	General surgery ..	41	41	28	13	123	80	203
Diseases of the chest ..	16	17	13	3	49	11	60	Anæsthetics	24	19	9	2	54	8	62
Mental health	39	33	14	11	97	18	115	Neurosurgery	5	3	3	2	13	7	20
Neurology	6	1	4	2	13	1	14	Plastic surgery ..	5	1	3	3	12	6	18
Paediatrics	7	8	5	5	25	14	39	Thoracic surgery ..	6	7	7	..	20	9	29
Radiology	21	22	11	4	58	2	60	Orthopædic surgery ..	19	11	12	7	49	18	67
Radiotherapy	7	4	5	..	16	1	17	Ear, nose, and throat surgery	12	10	10	3	35	15	50
Physical medicine ..	4	3	2	..	9	2	11	Obstetrics and gynæcology	24	20	9	13	66	38	104
Pathology	16	18	20	6	60	39	99								
Infectious diseases ..	1	..	1	..	2	3	5								
Dermatology	5	3	5	6	19	13	32								
Venereology	1	1	1	..	3	5	8								
Ophthalmology ..	22	13	6	11	52	7	59	Totals	325	275	188	112	900	377	1277

* Includes those holding "transitional" posts and 94 honorary and 33 part-time.

In England Now

A Running Commentary by Peripatetic Correspondents

ENDEAVOUR

Man's inventions and achievements
During his long sojourn on the Earth
Give us glimpses of a spectrum
At once colourful and marvellous:
Skill and dexterity are begotten
Of truth and beauty;
Out of science he fashions harness for the elements;
And in the arid desert
He builds a living city
That reaches upwards to the stars.
But man's exertions merge into the sublime
When, on the wings of the morning
He soars into the spacious canopy of God's universe:
Into the ultra-violet zone of intellect—
Where colours fade
And things unseen
Are the things eternal.

* * *

Letter from the 15-year-old daughter of a community hygienist to her mother, dated June 16, 2056.

My dear Mummy,

I had a lovely day for my birthday. I think Teacher must have known it was my birthday for after lunch (we had acorns and medlar cordial) we were taken to the London Museum. It was wonderful. First we were shown over the ancient part which we were told was in existence over a hundred years ago and then we were taken round the new People's Palace of Health and Culture. You may have read that it was opened last month by the Secretary of State for Stratospheric Affairs.

What we all liked best were the working models of the funny old underground railways. It seems that just before they gave them up in 1988 in favour of nuclear-propelled monorails they used to have white carriages and red carriages. You see, that was in the days when people smoked tobacco and some people thought that it caused cancer of the lung and other people who liked smoking didn't, so the ones who didn't mind getting cancer went in the red (for danger) carriages and smoked and the ones that didn't want to get cancer went in the white ones which were labelled "non-cancers." Of course they didn't know in those days that the underlying cause of cancer was a deficiency of guava jelly and that tobacco only hastened their end because they were going to die of some form of cancer anyway ten or twenty years later. Actually the N.P. monorails just came in time because all Londoners were found to be suffering from chronic emphysema, as well as cortical hypoxia, caisson disease, and claustrophobia for spending so much of their time underground.

The guide was most interesting, for he was born in 1907 and was just old enough to remember the Cigarette Age, and he had actually smoked them himself. He said they were horrid and a thoroughly bad habit. Daddy will be amused to hear that doctors were the worst offenders, and things got so bad in 1975 that only a quarter of them didn't get cancer of the lung and survived to sign up the death certificates of the other three-quarters. We saw the famous Nottinghill collection of ashtrays which the old man bequeathed to the nation. He was the last man to drink port and also the last man to be made a peer. Some of the ashtrays he had to pay ever such a lot of money for at Christie's. We also saw some amusing things called petrol lighters. They caused cancer of the antrum and singed eyebrows.

The guide said that when he was our age he would have been surprised to be taken round by a man aged 149, but they hadn't learnt then about the "peace-of-mind factor" without which people used to grow old. Incidentally it was once called "the tortoise factor" because it was first isolated from the chyle of a tortoise. He said that in the fifties of last century people used to do extraordinary things and get awful diseases through eating butter and margarine and meat and canned peas, and drinking milk contaminated with strontium 90 and tea, and washing their knives and forks and plates and also their undies in detergents. Apparently their bread was dreadful too, and they were always having rows about it in Parliament and in the medical journals. He said that for a long time Americans and Britons used to die of coronary thrombosis and everyone thought it was due to worry and eating butter and trying to get through traffic jams in a hurry (automobiles had to keep on the ground then), till someone remembered that the two nations had something else in common—*they used to eat eggs for breakfast*—just think of it, cholesterol! No wonder their coronary arteries were all choked up. Why a child would know better than that today.

By the way, we saw the National Collection of Alcoholic Drinks, including whisky and sherry and gin in their original 20th century bottles. Apparently before the passing of the Wine Restriction Act of 1990 (which followed the Abolition of Drinking Spirits Act of 1987—Teacher says I'm jolly good at history) you could buy all sorts of nasty gastric erosives and you didn't have to produce a certificate of gastronomic proficiency and submit the menu to the Ministry of Dietetics like we do now to get a bottle of wine. In those days you could murder wine with bad cooking if you wanted to.

I thought there was something else to tell you; Lenina and John have been granted their permissive Licence of Procreation. They said they had no trouble with the Psychiatric Board but there was a good deal of bother with the geneticist wallahs because some of Lenina's genes didn't tie up properly with his blood-group, but any way they passed them in the end. I am so pleased about this because she is so deserving of the honour of motherhood.

Remember I shall be home for the weekend after next because great-great-granny is taking me on a botanical hike in the Himalayas. When you make up the picnic hamper don't forget the unsaturated fats. Until Friday week, your loving daughter,

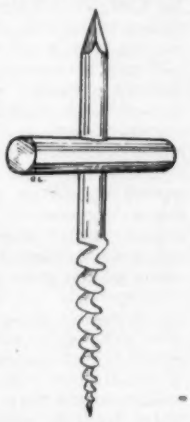
Helen.

* * *

NEW INVENTIONS

A Useful Brain Biopsy Burr

Attempts to obtain brain-tissue with a hammer and chisel have not proved entirely satisfactory for routine investigation in the living subject. Great advances in the technique came with the introduction of the Jones brain-biopsy burr. Consisting of a spiral cutting-edge mounted at right angles to the handle, this instrument made it possible to extract adequate biopsy samples by a simple manœuvre of rotation, pressure, and brisk traction. In the hands of Smith, frequent resort to the state of the plantar responses proved an essential feature of the procedure, and a sharp metal spike was therefore added to the handle. This modification suffers from the disadvantage that, in order to apply the spike to the sole of the foot, the burr must be removed from the skull, which is a pity.



In this new modification (see accompanying figure) of the Smith modification of the Jones burr, the spike is rendered detachable, by simply screwing it on and off. Thus, the plantar responses may be elicited without having to dislodge the entire instrument from the skull each time, and it has been used in a small number of volunteers with the minimum of complications. Since the spike is used solely for the feet, sterility is neither necessary nor desirable. Moreover, if damaged or broken, it can be replaced at a fraction of the total cost. Owing to its ready detachability, the spike has also proved of value in numerous other uses about the theatre, and it is ideal for prising open tin lids for anæsthetists' coffee.

It is a pleasure to acknowledge the help of the research division of the Deathly Soundproofing Construction Co., Ltd., without whose coöperation this work would not have been possible. Grateful thanks are also due to Sister Cannon for permission to use the theatre; to the governor of Parkmoor Scrubs for special facilities; and to the district coroner for one piece of advice. The instrument is manufactured by the Publican Bottle Accessories Co., Potheen, Cork.

Letters to the Editor

RADIATION HAZARDS

SIR,—The Medical Research Council report is of great interest, and many of its results must be accepted. In particular it seems that the genetic damage caused by experimental nuclear explosions so far is much less than that caused by diagnostic radiology in economically advanced countries. This is probably so for the world as a whole, since the British figures are fairly typical for some 400 millions of human beings; though in the absence of protection from houses the danger from fall-out in the tropics may often exceed that in Britain, sometimes by a factor as high as 7, the value given on p. 57 of the report.

But the report seems to suffer from two defects, one of presentation and one of calculation. In its table 1 D (p. 93) the extra births of phenylketonurics among a generation of 20 million due to a doubling of the mutation-rate are given as 5. But the total in all subsequent generations, supposing the population of England to remain steady, would be 500; and the total for the world, on the same assumption, would be about 60 times this figure, or 30,000. Phenylketonuria accounts for about 1% of severe mental defect, but not all mental defect is genetically determined. If two-thirds were genetically determined, a doubling of the mutation-rate for one generation would probably lead to the birth of about 2 million mental defectives, and also, in my opinion, of a somewhat larger number of physically defective children and a good many more abortions and stillbirths.

The report estimates the increase of radiation to human gonads from test explosions as less than 1% (p. 59), or less than 0·03r per generation, and the doubling dose as 30 to 80r (p. 45) or 10 to 27 times the natural dose. So if tests continue at the present level during one generation, their total effect would be to produce only about 2000 mental defectives or less. However this may be, I think that a figure of 5 might prove unduly reassuring to a casual reader, even if a figure of 2 million is regarded as too alarming.

But I believe that these figures are too low, for the following reason.[1,2] Before any atomic bombs had been exploded, I calculated the probable mutation-rates corresponding to existing frequencies of congenital abnormalities. The calculation was therefore unaffected by any emotions concerning nuclear warfare. If a recessive gene for a character such as phenylketonuria has a frequency of 0·5% in gametes (as assumed in the report) and no phenylketonurics breed, this means that, apart from inbreeding, 0·5% of such genes meet with other similar genes per generation, so such a gene has an average "life" of 200 generations between its appearance by mutation and its elimination by natural selection. But inbreeding accounts for a good many cases. Of Munro's[3] 47 families containing phenylketonurics three parental pairs were first cousins, two were more distant relatives, and very likely another five or more were still more distantly related, the two genes which coöperated to produce an idiot or imbecile being due to the same original mutation.

If, in fact, 11 or 12 of Munro's families (say, 25%) were from consanguineous parents the mean "life" of such a recessive gene is reduced to 160 generations. But in the middle ages and earlier, inbreeding was far more prevalent than today. Most people lived in villages and married neighbours. Thus recessive genes were eliminated much more rapidly than today, and a higher mutation-rate was needed to balance this elimination. Owing to the long "life" of these genes the present gene frequency was effectively determined many centuries ago. It is difficult to guess at the intensity of inbreeding in mediæval England. I have assumed a figure well below that found for a Jewish community in South Germany, but above that of nineteenth-century European peasantries. On this basis one can very roughly calculate the mutation-rate, and it turns out to be about 2·6 times that given in the report, perhaps more. For rarer genes the correction is greater. Thus I think that the total number of mental defectives produced by a doubling of the mutation-rate during one generation would be nearer 8 million than 2 million, and might well exceed 10 million. Since it is stated in the M.R.C. report (p. 90) that the principles on which mutation-rates can be indirectly estimated were laid down by myself in 1932, I think that my own subsequent work, which increased the estimates by a considerable factor, might have been taken into consideration. I am aware that they were stated in a rather abstract and mathematical form. For this reason I have given them here in as simple words as I could achieve. I may add that when the correction is made, the doubling dose for the gene for phenylketonuria, if it is as sensitive as the average of 7 genes investigated by Russell[4] in mice, becomes about 36r, which is in accordance with the findings of the report (p. 45). The detailed calculations will be published elsewhere.

I wish to emphasise the importance of human inbreeding for another reason. It is proposed to compare the frequencies of several abnormalities in different areas, in the hope of discovering or disproving a mutagenic effect of radioactive substances in the soil. In the case of rare recessive conditions inbreeding in some rural areas may be expected to have a very large effect. Since, on the whole, inbreeding may be expected to be higher in the more radioactive areas of Britain (e.g., West Cornwall and Aberdeen) than in the country as a whole, rare recessive conditions will also be common. And this might well lead to an overestimation of the mutagenic effect of radioactive minerals. For this reason it is my conviction that such a survey would be a waste of public money, and what is even more serious, of the skill of the men and women who undertake it.

It must also be remembered that the human doubling doses of radiation *may* be higher than for most other animals, on account of the great length of human generations. Thus a human generation is about sixty times as long as a mouse generation, and a man receives 60 times as much radiation per generation. But the number of nuclear divisions per generation, which may also provoke mutation, is not much greater in men than mice. Hence radiation may be a relatively more important mutagenic agent in men than mice, and the doubling dose correspondingly lower. If so the calculated effects must be multiplied by a further factor.

University College,
London. J. B. S. HALDANE.

1. Haldane, J. B. S. *Ann. Eugen.* 1939, **9**, 232.
2. Haldane, J. B. S. *Ibid.* 1940, **10**, 417.
3. Munro, T. A. *Ibid*, 1947, **14**, 60.

BURNS AND SCALDS

SIR,—Your leader of May 19 and the letters from Dr. Hall-Smith (May 26) and Dr. Leonard Colebrook (June 2) discuss the treatment to be carried out—in the home or in the surgery—of burns and scalds which are sufficiently superficial to justify non-hospital treatment. Dr. Hall-Smith protests that your advocacy of an anti-histamine ointment encourages the development of sensitisation eczemas. Dr. Colebrook upbraids you for neglecting the advice of Bull et al.[5] to use topical penicillin. Dr. Hall-Smith remarks that anti-histamine ointment is fast replacing the topical antibiotics as the most potent cause of iatrogenic dermatitis. Dr. Colebrook denies that topical penicillin is likely to produce

4. Russell, W. L. *Radiation Biol.* 1954, **1**, 825.
5. Bull, F. P., Jackson, D. M., Lowbury, E. J. C., Topley, E. *Lancet*, 1951, **i**, 161.

this sensitisation in more than insignificant numbers. Here I think most dermatologists and many practitioners would differ. But is Dr. Hall-Smith's ointment (hydrocortisone and neomycin) itself above suspicion?

I find it difficult to accept that 38% of the burns you consider suitable for treatment by the housewife or the general practitioner will become infected with hæmolytic streptococcus if they are not treated with penicillin cream; yet this is what Dr. Colebrook would have us infer from his letter. I believe he is trying to apply the results of studying the severe burns he saw at the Birmingham Accident Hospital to the more trivial ones seen on the practitioner's rounds, and I do not think one can safely do so.

I have now been watching and treating the obviously superficial burn for ten years, and I am convinced (with Dr. Hall-Smith) that the risks of sensitisation to topical antibiotics are very real, and that they are not outweighed by the dangers of streptococcal invasion in this type of injury. I have used anti-histamine ointments and not seen any trouble so far—but I will heed his warning. I will continue to clean these burns with cetrimide ('Cetavlon'), to dry them, and cover them with tulle-gras. I will not be converted to topical antibiotics (having abandoned them) unless I see much more streptococcal invasion than I do at present. I will arrange admission to hospital of the deeper burns, as soon as I suspect they *are* deep. I will continue, I am sure, to make occasional mistakes, and to present a colleague, or my own ward, with a streptococcal wound—but not in 38% of cases. And I will still be able to look the dermatologist in the eye.

On reflection Dr. Colebrook will probably agree that the prolongation of the old lady's disability was less likely to be due to early infection than to unrecognised full-thickness damage, and unrecognised full-thickness damage brings its own infection with it. Neither penicillin cream nor any other application would have done as much as a decision to send the case to hospital for early skin-grafting. If penicillin cream is called for every time the kettle is upset, it will do more harm than good.

Sunderland. T. G. LOWDEN.

DETENTION OF THE MENTALLY HANDICAPPED

SIR,—Medical superintendents of hospitals for the mentally handicapped must be somewhat bewildered at the moment. If they keep patients too long in hospitals they are criticised, and if they license them out they are liable to be accused of subjecting the general public to risks from violence.

The question as to the suitability of a patient for release to the community is surely a matter for experienced medical superintendents who have had these patients under their continual observation.

The high-grade mental defective is probably quite able to perform remunerative tasks and may appear on the surface to be suitable for discharge. Yet personal histories may reveal tendencies to persistent immorality, thieving, indecency, and inability to conform to normal standards of living. Instances of inability to cope and plan (typical of the high-grade defective) are well known; many of them are far happier in the institution atmosphere where their occupations and social activities are arranged for them. Medical superintendents required to give evidence in courts of law have their hands tied and cannot reveal confidential case-histories which might embarrass relatives; it is unfortunate that dispensers of the law are so ready to make comments and give views on superficial examination without specialised knowledge of the problem. It is doubtless true that there have been cases of wrongful diagnosis and certification, but I suggest that such cases are few and that there is no need for panic measures.

The recent circular of the Board of Control [1] has been viewed with concern by local authorities, who have always taken an impartial view of recommendations for discharge from institutions, since sooner or later they may have to provide further care and supervision for these cases. I agree with the view expressed by the medical superintendent of a large hospital [2] that eighteen months is insufficient time in which to judge whether a patient is stable enough to be at large in the community.

Fitness for discharge should be decided on the individual merits of each case. One step that may help to solve the problem is the provision of sheltered day workshops, combined with residential hostels, giving a certain amount of liberty coupled with kindly discipline and supervision.

Z. P. FERNANDEZ
Chairman, Leeds Mental Health Services Subcommittee.

1. See *Lancet*, April 7, 1956, p. 379.

PAIN IN PEPTIC ULCER

SIR,—Your leading article of June 16 omitted one of the principal considerations. It is clear that all pain is conditional upon the state of the higher levels of the brain. Further, it has long been established that the movements and secretions of the stomach are adjusted by conditioned reflexes which pass through the cerebral cortex; and conditioned responses have been obtained from painful stimuli. It is thus reasonable to suppose that there is a process of interaction between stomach and cortex—a supposition supported by the prominent rôle of psychological factors in peptic ulceration. Account must therefore be taken of those changes which Pavlov showed to occur in the functional derangement of cortical cells, especially pathological inertia and the paradoxical phase.

I venture to suggest that attempts to explain the pain of peptic ulcers mechanistically in terms of local factors alone do not correspond to the clinical problem. On the other hand, a study of the local pathology in relation to the pathophysiology of conditioned reflexes might be more rewarding.

Sheffield. C. H. FOGGITT.

TUBERCULIN-TESTING OF SCHOOL-CHILDREN

SIR,—It is five years since MacDougall et al.[3] reported the results of tuberculin-testing of school-children as a method of detecting sources of tuberculous infection. Independently a similar scheme was started in Ipswich in 1950, and since then 752 children have been referred by the school medical service to the chest clinic for investigation. 688 (91%) children and their families and other home contacts have been seen. As a result 42 cases of tuberculosis, including 8 of active disease, have been discovered among the children, and 39 cases, including 6 of active disease, among the contacts. This is not a great harvest compared with the results of others, but it has been a worth-while experience from which we would draw the following conclusions:

1. The shorter the interval between the infection and the tuberculin-testing, the greater the likelihood of success. At a residential school we discovered 4 active cases among 13 converters tested at an interval of a year.

2. A very thorough search of all home contacts must be made. At least 3 active cases came to us through other sources within a short time of the tuberculin-testing of the children.

3. All home contacts must be interviewed. It is humiliating to discover the proportion of infections that can be traced to known sources (50–60%).

4. In an area where bovine infection has been recently present the results of testing can be most confusing, but with experience past and present bovine sources can be identified and fairly accurately dated.

5. The tuberculin-jelly test, using flour-paper, gives a high rate of false positives (20%) in 5-year-old children compared with the Heaf multiple-puncture or Mantoux tuberculin tests.

2. *The People*, June 10, 1956.
3. MacDougall, I. A., Mikhail, J. R., Tattersall, W. H. *Med. Offr*, 1951, **86**, 253; *Brit. med. J.* 1953, i, 64.

6. The incidence and annual rate of infection at specific age-groups are valuable guides to the incidence of tuberculosis in the community.

In certain districts of Norway annual tuberculin-testing of school-children has been practised for many years. When conversions do occur, which may be at intervals of three or four years, a diligent search, which rarely fails, is made for the source.

REGINALD LEADER
Medical officer of health.
CHARLES J. STEWART
Chest physician.
Ipswich.

PASSION AND CONTROVERSY IN SCIENCE

SIR,—I was very interested to read Professor Polanyi's article (June 16). May I point out the slight error in the spelling of Prof. J. H. van't Hoff's name?

Westminster Hospital,
London, S.W.1. WALTER VAN'T HOFF.

NOVOBIOCIN DERMATITIS

SIR,—Your comment of May 5 on Dr. Pellerat's objection to restriction of new antibiotics induces me to suggest a generalisation that may serve to waive authoritarian action in this regard. Although Dr. Pellerat and a growing literature point to the emergence of resistant staphylococci, this is still being encountered chiefly in hospital populations (human and bacterial), and geneticists who are familiar with bacterial mutation are still reluctant to predict dangers to those undosed by antibiotics. Strong independent opinion exists in this country that our gravest problem is in the indiscriminate use of penicillin and the "panallergenisation" to that antibiotic; an incidence that has been estimated at as high as 10%.[1]

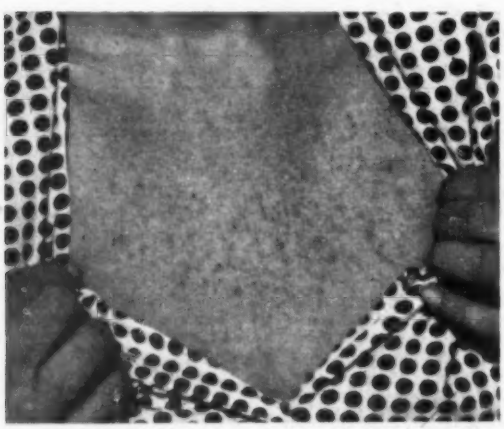
The wide use of the cationic mycin antibiotics (streptomycin, the tetracyclines, and the carbomycins) did not result in comparable sensitisation. True, these particular streptomyces-derived antibiotics are potent contact dermal sensitisers, but appear to be weakly allergenic in the injectant or ingestant phase. In fact certain hypersensitivity states have been treated by their administration.[2] An explanation of this contrast between the cationic mycins and the anionic penicillin may be found in a rule, pieced together from researches at the Canadian Red Cross Hospital in your country,[3] on the haptenic specificity of sulphated dextrans and those carried out in the United States on vaccine adjuvants.[4] This rule has been enunciated as "macroanions enhance antigenicity (of an immunising substance); macrocations diminish it."[3]

Believing in the validity of this rule, I have proscribed the recently introduced anionic mycins for my own patients. Several months ago, however, a housewife who had had a severe protracted urticarial reaction to penicillin ten years ago and who has had several bouts of recurrent purulent lymphadenitis, yielding in turn to the tetracyclines or carbomycins to which she is not sensitive, was given the still experimental streptonivicin ('Albamycin') because her wound flora, a carbomycin-oxytetracycline resistant staphylococcus, was found markedly sensitive to it. The third 500 mg. dose was followed by such an intense generalised erythema and pruritis that it was discontinued and another, supposedly dissimilar, antibiotic (Pfizer PA 93) was obtained. Naturally enough, since this is now known to be a novobiocin, the staphylococci proved susceptible in vitro. Two weeks after the administration of the streptonivicin, PA 93 was given; on the second day it was evident that the abscess was reacting well but the patient poorly. A maculopapular rash evolved over the next week, covering the scalp, cheeks, and torso, finally becoming pustular in the fashion characteristic of a dermatitis medicamentosa. One month after stopping PA 93 and two weeks after the eruption began to subside, pustules were evident on the chest (see accompanying figure).

Allergic dermatitis has just been reported[6] as a common complication of novobiocin. So has urticaria[7,8] and other skin rashes.[9] These have arisen during observations on small series and notes of caution have been sounded.[10] These are perhaps not as yet convincing as to the validity of the rule about anionics,[5] as applied to new antibiotics, but we should all dislike a repetition of the penicillin story.

Laurelton, Long Island,
N.Y., U.S.A. ROBERT D. BARNARD.

1. Barnard, R. D., Fox, H. L. *N.Y. State med. J.* 1953, **53**, 2826.
2. Barnard, R. D. *N.Y. Physician*, 1951, **36**, 2.
3. Glynn, L. E., Holborow, E. J., Johnson, G. D. *J. Path. Bact.* 1954, **48**, 205.
4. Takemoto, K. K. Personal communication.



Pustular dermatitis medicamentosa persisting one month after 750 mg. of oral novobiocin.

FIRST-AID MANUALS

SIR,—"First-aid" must interest many of your readers, and yet it is surprising how seldom it is mentioned in your columns. The quick and widespread reaction to the exchange on the "three-quarter-prone" position in head injuries[11] has prompted me to write this letter, in the hope that it may perhaps provoke a similar response.

Those of us who are required by law to train and appoint first-aid men in industry, or at least to supervise their training and appointment, are often in the embarrassing position of having to use a textbook whose teaching we regard as out of date and sometimes dangerous.

The transport of unconscious patients on their backs has already been commented on, but this is surely less undesirable than the treatment of wounds advised in the latest (1954) edition of the St. Andrew's Ambulance Association handbook, which says that "the edges should be gently sponged with some antiseptic solution such as diluted lysol, carbolic lotion (1 to 40), a weak solution of iodine (Liq. Iodi Mitis: B.P. 1932) or methylated spirit. . . . Some of the antiseptic used for cleansing the edges may be wrung out of a clean swab into the wound in order to complete the cleansing."

One feels that even Ambroise Paré would have disagreed with this, and yet it has continued to appear through seventeen editions.

This is perhaps the worst of several passages in this particular manual which should have been altered long ago. In the light of modern work on "surgical shock" and the improvement in the technique of accident surgery, passages in all the current textbooks need revision. Furthermore, I suggest that the revision should be supervised by people competent to assess

5. Freeman, M. D., Stanton, H. T., Barnard, R. D., Goldman, B. *Ann. Allergy*, 1956, **14**, 82.
6. Limson, B. M., Romansky, M. J. *Antibiotic Med.* 1956, **2**, 277.
7. Milberg, M. B., Schwartz, R. D., Silverstein, J. N. *Ibid*, p. 286.
8. Kessler, L. N. Personal communication.
9. Freeman, M. D. Personal communication.
10. David, N. A., Burgner, P. R. *Antibiotic Med.* 1956, **2**, 219.
11. *Lancet*, 1955, **i**, 657, 775.

the value of the advice offered from the points of view of ease of teaching, practical application to the recently injured, and conformation to the requirements of the receiving hospital. For this purpose I suggest the appointment of a committee composed of industrial medical officers and practising surgeons experienced in the treatment of accidents.

National Coal Board,
Scottish Division,
Lothians Area, Edinburgh.

C. E. WATSON
Area medical officer.

GENDER OF -ITIS

SIR,—Your peripatetic correspondent wandered a little too far last week. The U are particularly strong on Latin grammar, and would prefer to speak of "polyarteritis nodosa."

Folkestone, W.

F. I. CAIRD.

MEDICAL EDUCATION

SIR,—Most essays on "medical education" excite the profession's interest, and I hope I have sympathy in airing a disappointment that Dr. Ellis (June 2 and 9) should review so competently in his first article and then drift into platitude with his second. He knows well what is wrong but has obtained little satisfaction by arguing himself back to "essential steps."

I suggest that the foundation fault is contained in his title. The word "education" is by tradition limited to the developing adolescent mind and would be better avoided for any process applied over the age of 21. Thus, "further education" is really "further information," "postgraduate education" is "postgraduate revision," and medical education is a technical training—no more, no less.

I ask readers to imagine what would happen if other professions adopted our attitude. What kind of a man would a lawyer be, if he began his studies at 16! Or a priest! Surely, better doctors would be produced by a shorter but very intensive and resident course, to be given to minds of proved general ability, and not to be commenced before the age of 20 or 21.

Manchester.

A.F.

PHENYLBUTAZONE IN THE TREATMENT OF PROLAPSED INTERVERTEBRAL DISC

SIR,—I have read Dr. Steer's valuable letter (June 16) in which he reports favourably on the treatment of prolapsed intervertebral discs with oral phenylbutazone.

For the past $2^1/_2$ years I have treated such cases with this drug, and I am now preparing a detailed account of my experiences. Approximately twenty-five patients have been given this drug either orally or by injection and the results compared with the previous twenty-five cases treated by conventional methods.

At first 600 mg. of phenylbutazone by mouth was given daily for a week, after which the dose was reduced to 300 mg. daily for as long as necessary. I found that, although initially most of the cases responded satisfactorily, some showed a tendency to relapse or took a long time to recover. During the past 6 months I have been more successful with intramuscular injections of 600 mg. every third day for 6 weeks. All those receiving the drug in this way left hospital within 10 days and continued to receive the injections from the district nurse. In all the patients the relief from pain was rapid and the condition was usually cured by the end of the 6-week period. In one instance an operation which had been advised for relief of pain of three years' duration has been avoided.

It can be concluded therefore that this method of treatment may be superior to those in present use, but lengthy controlled clinical trials are necessary to establish its true value.

Dudley Road Hospital,
Birmingham.

R. O. GILLHESPY.

ANÆMIA IN PREGNANCY

SIR,—In your leader of June 2, the possible need to supplement dietary iron in pregnant women is considered entirely in terms of hæmoglobin, as though the only metabolic rôle of iron in the body was to provide part of the hæmoglobin molecule. Furthermore no differentiation is made between nullipara and multipara. Changes in the observed values for mean corpuscular hæmoglobin concentration and hæmoglobin mass may result from depletion of the iron store of the body, but neither is a measure of the size of this store. There is no satisfactory way of measuring this in man at present.

Surely the question of supplementary iron in pregnancy should be related to the problems of whether the mother, at her first menses after pregnancy and lactation, has a total body-iron content as great as when she conceived as a nullipara, and of whether her iron stores are replenished by the time she conceives again.

There is little experimental evidence on this aspect of iron metabolism, but observations on rats by Widdowson and McCance[1] give a hint that the iron stores of a woman might still be depleted at her first post-pregnancy menses. Such depletion might be prevented by supplementary iron during pregnancy.

Department of Chemical Pathology,
Westminster Medical School,
London, S.W.1.

D. MARRACK.

FOOD-POISONING AND DETERGENTS

SIR,—To combat the constantly rising incidence of food-poisoning and other infectious gastro-intestinal complaints, the newly introduced Food Hygiene Regulations aim at improving the cleanliness of food-handling premises and the personal hygiene of food-handlers. These requirements will cost the catering trade large sums. Is there any certainty that they will reduce the incidence of these conditions?

These diseases have become more prevalent in the past ten years despite great efforts by health departments in raising standards of personal hygiene in food-handlers and improvements in equipment, methods, and cleanliness in food-handling premises. It is therefore unlikely that any material benefit will accrue from further efforts in these directions.

If, after all the attention given over the past ten years to personal hygiene and cleanliness in food premises and even homes, the incidence of food-borne infections is still increasing, it suggests to me that we are *not* attacking the problem at all and some other factor or factors must be involved. In an effort to find other possible contributory factors it is worth considering what other changes have occurred in our way of life simultaneously with the increased incidence of food-poisoning; and one stands out clearly—namely, the introduction of powerful, non-bactericidal, synthetic detergents as a substitute for soap and their widespread use over the past ten years in homes and particularly in catering establishments.

Is there a connection between the use of detergents and the increase in food-poisoning? Because of the widespread use of detergents for cleansing crockery, and the difficulty even with special care and attention of removing every trace of these, we must all be ingesting small amounts of detergent every day from our eating and drinking utensils especially when the more usual perfunctory methods of washing-up are employed. Detergents lower surface tension and can thus presumably affect cell permeability. In solution they are excellent solvents and could presumably interfere with the normal protective mechanism of the gut-lining, thus facilitating absorption of toxins and even the penetration of the mucosa by bacteria.

Is it possible that the distribution among the community of the food-poisoning organisms is unchanged and that before the introduction of powerful detergents we obtained relative natural immunity by the ingestion of small doses of organisms with which our normal protective mechanism could cope, and also that small doses of ingested food-poisoning toxins did not penetrate the gut-lining in sufficient quantity to give symptoms? Such a possibility is not referred to by the

1. Widdowson, E. M., McCance, R. A. *Biochem. J.* 1948, **42**, 577.

Committee on Detergents, whose final report appeared last week.

Unfortunately, as a whole-time medical officer of health, I have not the time to investigate myself these suggestions in the laboratory and I therefore offer the idea to any research-worker who may be interested.

Doncaster. H. L. SETTLE
Medical officer of health.

NOT OXFORD

SIR,—Many other Oxford men will join with me in applauding the initiative of the distinguished band of Cambridge medical men who, as reported in your last issue, realised the error of their ways just in time and took their degrees in the University of Oxford.

As a traditionalist, however, I feel I must protest against certain departures from precedent. No notice of a congregation on June 7 was given, and we were thus deprived of the opportunity of attending and welcoming our professional brethren appropriately. No witnesses can be found, nor has any mention of the conferment of these degrees appeared in the *O.U. Gazette*. Can it be that the silent Roman Emperors outside the Sheldonian were the sole spectators of some secret nocturnal ceremony?

Most deplorable of all was the use of English in the proceedings. Can the banal "By proxy" compare with the euphonious syllables of "In absentia"? One can only surmise that the vice-chancellor sanctioned this departure from traditional practice as a special concession, well knowing that Cambridge men would be untutored in the liberal arts.

Finally, Sir, what of the future? Are the lemmings on the move?

Westminster Medical School,
London, S.W.1. ANDREW SHERRINGTON.

*** We regret that last week (p. 1021) graduates of the University of Cambridge on whom the degrees of M.D. and M.B. had been conferred were shown as having gained the D.M. and B.M. of the University of Oxford. Otherwise our announcement was, we hope, correct. An amended notice will be found on p. 1078.—ED. L.

METHYLTESTOSTERONE

SIR,—Oral methyltestosterone has been used in clinical practice since its introduction by Foss in 1939,[1] both for its anabolic and for its androgen effects. It was not until 1947 that Werner [2] suggested that its use might occasionally be associated with jaundice. Other reports followed.[3–5]

The hepatic lesion found in cases of jaundice following methyltestosterone therapy was not associated with the laboratory findings usual with severe parenchymal damage or biliary obstruction: the cephalin-flocculation reaction was negative, the serum alkaline phosphatase only moderately elevated, and the serum-bilirubin increased. Werner thought it improbable that methyltestosterone was a markedly hepatotoxic agent, since the syndrome was rare, despite the widespread use of this hormone. Further, in two patients who had recovered, renewed administration of this methylated compound failed to reproduce jaundice.

Since testosterone has not been so implicated, some pharmaceutical literature has given this as a reason in favour of sublingual or sublabial tablets of testosterone. Though testosterone when given orally is ineffective, owing to deactivation by the liver, the makers and others claim that given by the sublabial route it is as effective as parenterally administered esters.

Methyltestosterone, on the other hand, is effective both when swallowed and when absorbed sublabially, although it is slightly more efficient by the latter route.[6] It would seem, therefore, that methyltestosterone is less wasteful, as some of the hormone from the sublabial tablet of testosterone is bound to be swallowed in the saliva, particularly from the sublingual site. The metabolism of these two hormones is indeed different in that methyltestosterone (*a*) increases creatinuria and (*b*) does not increase the 17-ketosteroids. Although not directly related to the problem, it is perhaps of incidental interest that Lloyd-Thomas and Sherlock [7] used methyltestosterone to relieve the distressing pruritus of obstructive jaundice.

In a fairly extensive use of methyltestosterone, with doses ranging from 5 mg. daily to 150 mg. daily over long periods, we do not happen to have come across a case of jaundice. Since for practice purposes it would be a pity to omit the use of methyltestosterone, we should like to know whether any physicians in this country have noted jaundice which they attributed to methyltestosterone therapy.

Bristol. G. L. FOSS.

London, W.1. S. LEONARD SIMPSON.

ELUTION AND MICRO-ESTIMATION OF 5-H.I.A.A.

SIR,—The new colorimetric method of Udenfriend et al.[8] for the quantitative estimation of urinary 5-hydroxyindole acetic acid (5-H.I.A.A.) is based on the older Gerngross reaction with 1-nitroso-2-naphthol and is simpler but less specific. It is, moreover, liable to serious error if "metabolic" keto acids are not completely removed with 2 : 4-dinitrophenylhydrazine, before the final extraction. Further, in all methods involving extraction if the extraction time, if quoted, is not strictly adhered to, quantitative results will not be obtained. These inherent weaknesses in the Udenfriend method can be overcome if the urine containing pathological amounts of 5-H.I.A.A. is directly applied to the paper for chromatographic separation and estimation. In normal urines, however, where the concentration of 5-H.I.A.A. is much less (1 to 5 μg. per ml.), it is still necessary to extract the 5-H.I.A.A. with ether, and evaporate to dryness in vacuo. The quantitative estimation of 5-H.I.A.A. by means of one-dimensional paper chromatography depends on a clear-cut separation of the spot, especially if an elution method is used; and whether the total colour in the spot can be quantitatively determined by photometric evaluation of the spot area and intensity, or by elution followed by colorimetric estimation; and whether Beer's law holds for the colour reaction employed and for the subsequent elution.

A semi-quantitative method for the estimation of 5-H.I.A.A. can also be used by assessing visually the amounts of 5-H.I.A.A. contained in the spots, as regards area and intensity of colour of the spot given by the urine and spots obtained with standard amounts of 5-H.I.A.A. This method could be used in the clinical sideroom. But I am not aware of any detail method where a micro-analytical technique, using paper chromatography has been fully described in relation to urinary 5-H.I.A.A.

The method is based on the simple expedient of cutting out the spot of the developed chromatogram which contains the 5-H.I.A.A., eluting it from the paper, and determining the amount of 5-H.I.A.A. in the eluate. It was found that the coloured product formed by staining the chromatogram with Ehrlich's reagent could be quantitatively eluted and its concentration determined colorimetrically. This was done by applying 5 μl. aliquots of a standard solution containing 2 μg. per 5 μl. 5-H.I.A.A. to Whatman no. 1 filter paper using an Aimer automatic ultra micropipette (0·005 ml. capacity).

1. Foss, G. L. *Brit. med. J.* 1939, ii, 11.
2. Werner, S. C. *Amer. J. Med.* 1947, **3**, 52.
3. Kinsell, L. W. *Gastroenterology*, 1948, **11**, 672.
4. Werner, S. C., Hanger, F. M., Kritzler, R. A. *Amer. J. Med.* 1950, **8**, 325.
5. Wood, J. C. *J. Amer. med. Ass.* 1952, **150**, 1484.
6. Foss, G. L. *J. Endocrin.* 1956, **13**, 269.
7. Lloyd-Thomas, H. G. L., Sherlock, S. *Brit. med. J.* 1952, ii, 1289.
8. Udenfriend, S., Titus, E. O., Weissbach, H. *J. biol. Chem.* 1955, **216**, 499.

The spots were dried after each application, and the chromatograms developed for three hours by the ascending technique in the following solvent system: *n*-butanol-acetic acid-water (4 : 1 : 5 *v/v*).[9] The chromatograms were then air-dried and drawn through a solution of Ehrlich's reagent,[10] and the blue colour allowed to develop for eighteen hours. The stained areas were then cut out as rectangles, allowing a suitable margin and choosing a size suitable to all concentrations. One stained area of similar dimensions was taken from a position adjacent to one of the standard spots, and used as a solvent blank. Each of the areas was then extracted with 3·1 ml. of 50% acetone in 10% HCl at 30°C for twenty-four hours and kept in the dark. The extracted colour appears to be quite stable, even if exposed to light for several days.

The absorption curve for the blue colour was established on a Unicam SP. 600 spectrophotometer, using 10 mm. fused-glass cells; and by choosing a wave-length of 610 mμ, a calibration curve was established which obeyed Beer-Lambert's law over a range of 0–20 μg. 5-H.I.A.A. with an optical density of 0·223 for 20 μg. The law was also obeyed by non-chromatographed standard spots over the same range.

Clinical Research Laboratory,
Department of Obstetrics and Gynæcology,
University of Edinburgh. F. J. SCANDRETT.

BREAD

SIR,—I had hoped to see much correspondence concerning the proposed further reduction of the extraction-rate of wheat.

Present-day brown bread is not palatable: I have heard complaints about this from many districts, and I myself have failed to procure any really good brown bread. Even those firms which formerly provided delightful brown bread now produce a spongy sticky loaf. Can it be due to a new method of baking?

Has the work of Sanderson Wells and of McCarrison so soon been forgotten? We of the older generation remember the beautiful nutty-flavoured bread of our youth. During the war I made delicious brown bread with yeast and stone-ground wholemeal flour, made from wheat grown on composted ground. Several colleagues tell me that they have reverted to that practice, which produces a palatable loaf.

London, W.1. AGNES SAVILL.

SIR,—In the House of Lords debate on bread[11] the possible dangers of using chlorine dioxide as a flour improver were discussed, and the case against it failed. However, no mention appears to have been made of its possible rôle in hypersensitive individuals. Sheldon and Yorke[12] showed that flour treated with agene or chlorine dioxide was undoubtedly very harmful to their hypersensitive patient. Their case resembles in many respects the syndrome of headache, insomnia, and depression following infections that I described recently.[13] If further work shows that this syndrome is as common as I believe it is, and in some way is related to the "improving" of flour as I think it may be, then the present Government policy towards "improvers" should be reviewed. In the meantime, I shall advise my patients to eat only untreated bread and flour if they wish to be on the safe side. If such an attitude were to become a popular health fashion, "improvers" would soon disappear without any Government action.

Hove, Sussex. GUY DAYNES.

SIR,—In the recent discussions on the composition of bread, insufficient attention seems to have been paid to certain aspects of the Food and Drugs Act.

Section 1 makes it an offence for any person to abstract from food any substance so as to make it injurious to health. The Act says nothing about the proportion of the population at risk, or about re-balancing the diet to counteract the effect of processing—it is concerned with the right of "a person," in the singular, against another person. Although most of the Act is concerned with the local authorities and their duties, this section can be used by any purchaser who complies with simple requirements on sampling. No local authority, Ministry panel, or committee stands between the purchaser and the courts. He must have the will, the money, and the evidence, but need wait upon nothing else. The purchaser need not be the consumer.

Hadley Wood,
Barnet, Hertfordshire. R. MAXWELL SAVAGE.

THYROTOXICOSIS

SIR,—It may help the busy clinician, in the "office" differential diagnosis of an anxiety state from slight thyrotoxicosis, to make the patient breathe deeply while the pulse is counted and note whether this produces a sinus arrhythmia.

Sinus arrhythmia is mediated through vagal reflexes, which are suppressed by heightened sympathetic tone—at least at the level of cardiac innervation—in hyperthyroidism. Though I have often noticed the appearance of sinus arrhythmia in patients as they become euthyroid after medical or surgical treatment of thyrotoxicosis, I have yet to meet a thyrotoxic patient who exhibits sinus arrhythmia. I have met many anxious people who do.

Italian Hospital, Queen Square,
London, W.C.1. E. MONTUSCHI.

PARTHENOGENESIS IN HUMAN BEINGS

SIR,—In a recent lecture by Dr. Helen Spurway,[1] the possibility of parthenogenesis occurring in human beings was mooted. Moreover, some of the criteria by which such a birth might be recognised were put forward. This led the *Sunday Pictorial* to inquire whether there were any mothers who genuinely believed that they had given birth to a parthenogenetic child. It was stated that any such child would be a girl. (Spurway later pointed out[2] that the possibility of parthenogenetic male offspring could not be ruled out, but they would be expected to be perhaps a hundred times as rare as parthenogenetic females, and in addition they would be defective.)

Nineteen claimants presented themselves. At this stage we were approached by the Editor of the paper with the request that we subject these claims to scientific investigation.

In planning these investigations, two possible mechanisms of parthenogenesis were considered:

(1) *Budding from somatic cells of mother.*—In this case mother and child would resemble each other as much as monozygotic twins because the genotypes would be identical, not only for their blood-groups, but also for all genes including those giving rise to the tissue antigens responsible for skin-graft compatibility.

(2) *Autofertilisation.*—In this case mother and child would not necessarily be alike, as the child might not have all the genes possessed by the mother, although she could not have any additional genes. A skin-graft from the child would be expected to take on the mother, but one from the mother would not necessarily take on the child.

Whichever of these mechanisms would be operative, the child could have no antigens which the mother did not possess.

Of the nineteen pairs of mothers and daughters who presented themselves, eleven pairs were eliminated at the preliminary interview. They were under the impression that a hymen which remained intact after conception had occurred, was what was meant by a "virgin birth."

9. Erspamer, V. *J. Physiol.* 1955, **127**, 118.
10. Jepson, J. B., Smith, I. *Nature, Lond.* 1953, **172**, 1100.
11. See *Lancet*, June 16, 1956, p. 956.
12. Sheldon, G. C., Yorke, A. *Ibid*, 1953, i, 577.
13. *Ibid*, Feb. 18, 1956, p. 296; see *Ibid*, Feb. 25, 1956, p. 303.

1. See *Lancet*, 1955, ii, 967.
2. Spurway, H. *New Statesman and Nation*, Nov. 19, 1955, p. 651.

The blood-groups of the remaining eight pairs were then examined with the following results :

Mrs. Alpha	A1	Rhesus phenotype ǒdĕdĕ
Daughter	A1	,, ,, ǒdĕdĕ
Mrs. Beta	A1	,, ,, CCDee
Daughter	O	,, ,, CCDee
Mrs. Gamma	O	,, ,, CCDee
Daughter	O	,, ,, CCDee
Mrs. Delta	A	,, ,, C̆C̆Dee
Daughter	A	,, ,, ǒdĕdĕ
Mrs. Epsilon	A2	Rhesus positive to anti-D
Daughter	A2B	,, ,, to anti-D
Mrs. Zeta	O	Rhesus phenotype c̆c̆DE
Daughter	O	,, ,, C̆C̆Dee
Mrs. Eta	O	,, ,, CCDee
Daughter	O	,, ,, C̆C̆DE
Mrs. Theta	O	Rhesus positive to anti-D
Daughter	A1	,, ,, to anti-D

Further blood-group studies were carried out on four of these pairs; and the results are shown in the accompanying table :

—	M	N	S	P	Lu	Le[a]	Le[b]	K	Fy[a]
Mrs. Alpha	+	+	−	+ +	−	−	−	−	−
Daughter	+	+	−	+ + +	−	−	−	−	−
Mrs. Beta	+	−	+	+ + +	−	−	−	−	+
Daughter	+	−	+	+	−	−	+	−	+
Mrs. Gamma	+	+	−	−	−	+	−	+	−
Daughter	+	+	−	+	+	+	−	+	−
Mrs. Delta	+	−	+	+ + +	−	−	−	−	+
Daughter	+	−	+	+ + +	−	−	−	+	−

Although the Betas could not be excluded on the blood-group results (since the A1 antigen is known to tend to suppress Le[b]) they were neverthless eliminated on the colour of their eyes, the mother having blue eyes, and the daughter having dark brown eyes.[3] One pair, Mrs. Alpha and daughter, were selected for special tests as follows :

(*a*) *Tasting of phenyl thiocarbamide.*—Both were " tasters " and could taste this substance at the same threshold value of 2·54 mg. per litre.

(*b*) *Test for secretors.*—Both mother and daughter did not secrete group-A substance in the saliva, and identical titres against A2 cells were obtained after incubating treated saliva from both against a known anti-A antiserum.

(*c*) *Direct filter-paper serum electrophoresis.*—Mother and daughter gave identical patterns.

Following these tests, skin-grafting between mother and child was performed. The graft from daughter to mother was shed in approximately four weeks, and that from mother to daughter remained apparently healthy for six weeks before showing signs of devascularisation. It was then completely wiped off by means of damp cotton-wool.

It will be of interest to workers in related fields that, despite the complete identity of blood-groups, there was still graft incompatibility. This raises the problem of how far we can now accept earlier assumptions as to the behaviour of grafts in parthenogenetic pairs.

In the case of the Alphas the probability of so good an agreement between mother and daughter, if the daughter had a father, is less than 1 in 100. It was ·0114 on the blood-groups. The data on taste brings it below ·01.

It is clear that a very much higher degree of probability must be attached to a claim made by a mother who could not possibly have any pre-knowledge of the results of these special investigations. In certain cases this absence of pre-knowledge has been taken by the courts to constitute proof of the rightness of a claim.

No further tests were undertaken because it was considered that such evidence as might be forthcoming would not materially affect the final estimate of probability.

The significance of the skin-grafting operations is obscure. Thus, while Spurway would expect that at least the graft from the child to mother would take, Folley [4] would apparently not be satisfied that such a result would be conclusive.

In such a case as this, rigorous proof is impossible, but it remains that all the evidence obtained from serological and special tests is consistent with what would be expected in a case of parthenogenesis. The absence of the pre-knowledge factor, although not capable of precise statistical evaluation, adds greatly to the probability of such a claim being well founded. Thus, this mother's claim must not only be considered seriously, but it must also be admitted that we have been unable to disprove it.

It is desirable that all who undertake investigations of this sort should publish the results, for in the long run the evidence can only be fully assessed if negative and inconclusive as well as positive results are available for criticism.

My thanks are due to Prof. J. B. S. Haldane, F.R.S., for permission to quote his statistical evaluation of the serological data; to Mr. David Wynn-Williams for undertaking the skin-grafting investigation; to Dr. Sidney Shaw, of Charing Cross Hospital, for carrying out the pathological investigation; to all these for permission to quote their results and opinions; and to Dr. A. E. Mourant, director of the Blood Group Reference Laboratory of the Medical Research Council, for samples of the rare blood-group sera. I should also like to thank Dr. Bernard Camber, of Charing Cross Hospital clinical research department, for his invaluable help and constant advice during this investigation.

An investigation of this kind was made possible only by the publicity given by a mass-circulation journal.

London, W.8. S. BALFOUR-LYNN.

VITAMIN K

SIR,—I have been interested in the effects of the two commonly used vitamin-K analogues—acetomenaphthone and 'Synkavit'—for the past ten years. The following notes on my experience in their use may be relevant to the current discussion in your columns of the dangers of overdosage with these substances, following the report (May 19) by Dr. Bound and Dr. Telford.

For a number of years, I have used the above vitamin-K analogues extensively for their apparent antibiotic effect,[5 6] resorting only occasionally and in special circumstances to the use of the popular and better-known antibiotics. I have consistently found the optimum oral dose of either to be 10 mg. daily or, when supported by vitamin E and " vitamin P " ('Rutin'), 5 mg. only; larger doses than these appear to have the reverse effect in many cases of infection and other conditions.

In view of this limited range of dosage and also an apparent conditioned deficiency of nicotinic acid often accompanying their use, possibly analogous to that induced by the sulphonamides, I have come to the conclusion that the vitamin-K analogues, given orally, may have a bacteriostatic effect on intestinal commensals, possibly by interfering competitively with their metabolism of natural vitamin K and thus lowering the synthesis of nicotinic acid as well as of bacterial toxins. Significantly, I have found the foods reputedly most abundant in natural vitamin K [7] to be the most powerful in counteracting the observed favourable effects of oral vitamin-K analogues.

For these reasons and for fear of interference with the vitamin-K metabolism of the host, I have studiously avoided the parenteral use of the analogues. Moreover, it is possible that vitamin K may be involved in metabolic processes other than that of synthesis of prothrombin.

The ease with which liver metabolism of natural vitamin K might well be disrupted by excessive parenteral dosage with synthetic analogues is suggested by the small dose (0·5–1·0 mg.) of menaphthone (the naphthoquinone nuclear moiety of natural vitamin K [8]) quoted by Professor Capon and his colleagues (June 16) as adequate for the correction of hypoprothrombinæmia.

3. Gates, R. R. *Hum. Genetics*, 1946, **1**, 88.

4. Folley, S. J. *New Statesman and Nation*, Nov. 26, 1955, p. 705.
5. Evans, D. M. *Practitioner*, 1946, **157**, 391.
6. Evans, D. M. *Ibid*, 1948, **160**, 306.
7. Bicknell, F., Prescott, F. Vitamins in Medicine. London, 1946 p. 804.
8. *Ibid*, p. 798.

It is surprising that the knowledge gained from study of the bacteriostatic action of sulphonamides, *p*-aminosalicylic acid, and other antibiotics has not been applied, long ere this, to the question of administration of vitamin-K analogues. Incidentally, to swing the axe in another direction, this point is also relevant to Dr. Schlesinger's allusion last week to over-prophylaxis against rickets. The substance commonly used for this purpose is vitamin D_2 (calciferol), a synthetic analogue of natural vitamin D, and, in view of the above considerations relating to vitamin-K analogues, equally deserving of a more critical examination. I described several years ago [1] some of its effects, short of idiopathic hypercalcæmia.

Merioneth,
North Wales. D. MARCUS EVANS.

PARAPLEGIA FOLLOWING SPINAL ANÆSTHESIA

SIR,—I hope that Sir Francis Walshe's verbal pyrotechnics do not blind your readers to the fact that the only opinion I have expressed on spinal analgesia (under the above heading) is that it is dangerous to store ampoules of the local anæsthetic solutions in antiseptics.

Oxford. R. MACINTOSH.

SIR,—Sir Robert Macintosh (June 16) replies to my letter of June 9 by questioning the training, skill, and experience of the anæsthetists to whom I referred. For his information I would point out that they were specialist or graded anæsthetists R.A.M.C., I.M.S., or I.A.M.C. Ashley Daley in the *Medical History of the Second World War, Surgery* (p. 221) details the training to which they were subjected.

Sir Robert's reference to the unknown, unaccounted dead of ill-administered general anæsthesia is apt. Death, however, is recognised as a hazard of general anæsthesia. Patients about to be anæsthetised are conditioned to the possibility that the end-result may be death. I doubt, however, whether any patient would opt for spinal anæsthesia if it was explained to him that the horror of paraplegia was a possible fate in store.

I venture to say, Sir, that, in these days of efficient relaxants, there is no place in our armamentarium for spinal anæsthesia. Before many years have passed this will come to be accepted by all surgeons and anæsthetists. It is time the leaders of our profession abandoned the practice and teaching of this outmoded technique.

London, S.W.3 L. H. LERMAN.

SIR,—This problem seems to have two parts.

The first concerns the sequence of events which brings about disaster, and especially the possible rôle of phenol. We know that phenol when placed intrathecally will generally have a destructive effect upon nerves: but we also know that it may not always do so (Haxton, June 23; Steel, June 9). At the moment we can only say that, where phenol is involved, it may be, but is not necessarily, the cause.

The second concerns the justification for the continued use of spinal anæsthesia.

Dr. Lerman proposes the all-too-easy solution of abandoning it. With all respect I disagree with this. We cannot be sure that there will never be a combination of circumstances which will make spinal anæsthesia the method of choice, and it would be unwise to restrict the doctor's freedom to choose what will best serve the interests of his patients. We can no more solve this problem as Dr. Lerman suggests than we can solve that of inhaled vomit in operative obstetrics by issuing an embargo upon general anæsthesia. As Professor Macintosh has pointed out, the latter is by no means free from risks or complications: nor is any form of anæsthesia thus blessed. We should not forget that anæsthetic hazards, regional and general, are essentially secondary, since they spring from the primary hazard that the patient has already suffered—that of becoming a person requiring operative treatment. Without running the gauntlet of these secondary hazards, it may be impossible to overcome the primary misadventure. It is our duty on some occasions to undertake these remote risks in the hope that the patient may thereby benefit.

I submit that spinal anæsthesia is, in some circumstances, a wholly justifiable procedure.

London, S.W.15. G. C. STEEL.

SIR,—For some years I have been impressed by the possibility of neurological complications following spinal anæsthesia, and I now rarely employ the technique. Nevertheless, in spite of the condemnation of several writers, I am convinced that the method will continue to be used because, in some circumstances, it can rationally be judged the safest, even though the occurrence of neurological complications be admitted. If this be so, then the important matter is to try to make the procedure as safe as we can. To this end no doubt research is needed, as has been suggested, but so is reasonable thinking.

Sir Francis Walshe (June 23) regards the injection of "an anæsthetic substance" as the salient common factor in the ætiology of these complications and charges an unnamed fellow medical-man with being "completely simple" in ignoring this proposition. It seems to me that the problem is by no means so straightforward, and I would like information on the following questions:

1. Can we assert with assurance that "neurological complications" never follow upon spinal puncture for diagnostic purposes, without the injection of anything? It seems to be difficult to be sure of this, for such a puncture is usually done in the presence of real or suspected disease of the nervous system and the rare occurrence of a complication could be confused with the developing effects of disease.

2. If, however, we assume, as Mr. Haxton (June 23) carefully puts it, that "the risk . . . is inherent in the injection" then is the deleterious factor (*a*) some physical effect of the injection of fluid; (*b*) the anæsthetic solution, remembering that these are chemically various and may very often be injected without damage, or (*c*) an accidental contaminating substance of which an infective agent, a skin disinfectant, or the carbolic solution provide examples?

3. Is it likely that there is a single causative mechanism or are there probably several? In general, the diagnosis of the location and extent of the lesion of the nervous system does not necessarily determine its nature, much less its cause.

The research, both experimental and by study of clinical experience, needed to solve this problem will be complicated and lengthy. Meanwhile we must concentrate on the most likely dangers, and wisely to select these requires calm thinking and ordinary courtesy toward varying viewpoints.

Department of Anæsthetics,
The Medical School,
Newcastle upon Tyne, 1. E. A. PASK.

EPHEDRINE POISONING

SIR,—In the following case of chronic ephedrine poisoning the patient had taken large doses of this drug for a long time.

On Jan. 6 this year a 49-year-old man was admitted to a surgical ward with a diagnosis of Graves's disease. He had had symptoms referred to the nose and throat since the age of 20, and of asthma since the age of 24. He had had pneumonia five times, and had twice been operated on for adenoids. In 1947 he had been tested with various kinds of pollen and grain, and had been vaccinated without effect. The patient had for some years been taking ephedrine and, in severe attacks, adrenaline. In the past five years his asthma had increased in severity. He had spontaneously increased the dosage of ephedrine until, in the past two years, he had been taking 1–1·5 g. of the drug daily. This dosage had caused palpitations, which had become more pronounced. He had become nervous and restless and his hands trembled. He had attacks of hot flushing, especially at night, and he sweated profusely. He had lost 8 kg. in weight despite a large appetite. He felt as if his eyes were being pressed out of their sockets, and had a constant sense of tightness round his throat.

When examined in the medical outpatient department on Jan. 13, he was nervous and restless; his hands trembled; skin moist, warm, and shiny; eyes slightly protruding; pulse-rate 100 per minute; blood-pressure 180/100 mm. Hg. The right lobe of the thyroid gland was slightly enlarged. There were clinical signs of emphysema. Total serum-cholesterol 228 mg. per 100 ml. Measurement of radioactive iodine (^{131}I) uptake showed 45·9% uptake in twenty-four hours. Basal metabolic rate 129%

After treatment with ephedrine was stopped all signs of hyperthyroidism disappeared.

No similar case has, to my knowledge, been recorded. This case may be of some interest in elucidating the ætiology of Graves's disease.

Rikshopitalet, Oslo, Norway. ANTON E. ÖDEGAARD.

MEDICAL CARE OF THE AGED

SIR,—It was of interest to learn, from your review of June 2, that Dr. Homburger's book was illustrated by that celebrated Hibernian artist Raoul "Duffy." We can now look forward to medical illustrations by his equally famous Celtic colleague MacTisse!

Department of Medicine,
State University of New York. MILTON PLOTZ.

THE HEBERDEN SOCIETY

SIR,—In your report (June 16) of the recent meeting of the Heberden Society we are quoted as having said that an antibody prepared by immunisation with synovial tissue reacted with reticulin, whereas an antibody to renal glomeruli did not. In fact we reported that antibody to glomeruli had been found to react with two groups of tissue elements—basement membranes and material present in the media of vessels forming one group, and reticulin the second. Antibody to synovial tissue, on the other hand, reacted only with the second.

D. G. SCOTT
Stoke Mandeville Hospital, A. G. S. HILL.
Aylesbury, Bucks.

INFANTILE PYLORIC STENOSIS

SIR,—In your very interesting editorial of May 19, the rôle of the ethnographic factor in the ætiology of this disease has been omitted.

Wallgren [1] cited Eckhaus from Turkey, showing that hypertrophic pyloric stenosis was rare in that country. Field [2] reported likewise about Malaya. It is believed that this disease is rare among Negroes.[3] In 1953 we made a survey in Israel [4] and found that the incidence of infantile pyloric stenosis in the Jewish population was much lower than that reported from Sweden [1] or England.[5]

Further surveys of the incidence of this disease in the whole population of a given area, performed in different parts of the world and in areas with a population of mixed extraction, could help to clarify this challenging part of the question.

Department of Pædiatrics,
University of Pittsburgh,
Pennsylvania. ZVI LARON.

MEMORIAL TO SIR JAMES SPENCE

SIR,—The friends and colleagues of Professor Sir James Spence in the University of Durham and the Teaching Hospital of Newcastle upon Tyne are anxious to commemorate his name and perpetuate his memory in ways which he himself would have appreciated. To this end it has been decided to appeal for funds for the following purposes:

To award a medal for outstanding contributions to pædiatric knowledge.—The award would be made from time to time by the British Pædiatric Association, usually, but not exclusively, to persons working in the United Kingdom or in any country of the Commonwealth who have made outstanding contributions to the advancement or clarification of pædiatric knowledge within the fields of clinical and social pædiatrics, clinical science, epidemiology, and family practice.

To establish an annual prize in pædiatrics for the students of this medical school.—This would consist of a sum of money and a volume of James Spence's collected writings to be awarded to the student submitting the best essay on any pædiatric subject which has excited his interest and led him to personal inquiry during his clinical training.

To provide a sculptured portrait head to be cast in bronze.—This would be placed eventually in the new Children's Hospital which we trust will be erected within the precincts of the Royal Victoria Infirmary.

We feel that these proposals will prolong his influence in ways which will commend themselves to his many friends. We would add that the university is being invited to rename the chair he held with such distinction "The James Spence Chair of Child Health."

Donations will be received by Dr. A. W. Sanderson, House-Governor and Secretary, the Royal Victoria Infirmary, Newcastle upon Tyne.

URSULA RIDLEY
Chairman of the Babies' Hospital House Committee
C. I. C. BOSANQUET
Rector of King's College
R. B. GREEN
Dean of Medicine
R. MUCKLE
Chairman of the Board of Governors
S. D. M. COURT.
Newcastle upon Tyne. Professor of Child Health.

1. Wallgren, A. *Amer. J. Dis. Child.* 1941, **62**, 751.
2. Field, C. E. *Lancet*, 1951, ii, 452.
3. Nelson, W. E. Mitchell-Nelson Textbook of Pediatrics. Philadelphia, 1950; p. 816.
4. Laron, Z. *Acta pædiat., Stockh.* 1955, **44**, 40.
5. Davison, G. *Arch. Dis. Childh.* 1946, **21**, 113.

The Editor of the *Medical Directory* writes: "The accuracy of the directory depends on the return of the annual schedule, which has recently been posted to members of the medical profession. Should the schedule have been mislaid I will gladly forward a duplicate upon request. The full name and year of qualification of the doctor should be sent for identification." The directory is published by Messrs. J. & A. Churchill, Ltd., 104, Gloucester Place, London, W.1.

Parliament

QUESTION TIME

Thermonuclear Weapons

Mr. ROY MASON asked the Secretary of State for Foreign Affairs whether, in view of the Medical Research Council's report on the hazards to man of nuclear and allied radiations and its findings regarding the danger of strontium 90, he would now seek international agreement with the major Powers concerned at least strictly to control all future atomic and thermonuclear tests.

Mr. A. D. DODDS-PARKER replied: The Government are prepared to discuss methods of regulating and limiting test explosions which take account of their position and that of other Powers and will seek every opportunity to put this policy into effect. The Government have already put forward proposals which will, no doubt, be considered by the Disarmament Commission next month.

Mr. KENNETH YOUNGER: Would the Foreign Secretary agree that the white paper and the corresponding medical reports of a similar nature which have been published in the United States are of a rather alarming nature, indicating, in particular, that scientists have very little idea what the medical effects are likely to be? There is a great lack of precise knowledge. Does not that indicate that some action rather more urgent than that contained in the Anglo-French proposals is now required? Mr. SELWYN LLOYD: One must form an individual judgment as to these reports. I should have thought that, on the whole, the reports were rather reassuring.

Fall-out of Radioactive Particles

Mr. MASON asked the Lord Privy Seal what research was being conducted into the possibilities of controlling radioactive fall-out over the United Kingdom.—Mr. R. A. BUTLER

replied: If the hon. Member has in mind possibilities of preventing or controlling the rate of fall-out of radioactive particles which already exist in the upper atmosphere, the answer is that there are, so far as is known, no means. Mr. MASON: Is the right hon. Gentleman not aware that this is a very disturbing reply indeed? We have already received a traceable amount of radio-strontium. There is a concentration of radioactivity in the atmosphere 200 times greater than what has already fallen. Does the right hon. Gentleman not agree that, without any more atom or hydrogen-bomb tests over the next few years, because of that much which is already falling, we shall already have received a high percentage, I think a dangerously high percentage, of radio-strontium? Mr. BUTLER: That raises rather a different issue, because that is set out in the Medical Research Council's report. I have to give the hon. Gentleman an answer which the best scientists in this country say is true—namely, that there is no method, so far as is known, of controlling radio-active fall-out in the manner suggested by the hon. Gentleman. Mr. MASON: Will the right hon. Gentleman not state clearly and emphatically whether he thinks that there is real danger? Is he not aware that this radioactivity is bound to fall and that the radio-strontium, with all its dangers and after-effects, will cause some grave concern in the near future? Mr. BUTLER: The words chosen by the Medical Research Council were very carefully chosen, and it would not be right for me to enlarge upon them. There is, of course, a degree of danger set out in the report.

Report on Maladjusted Children

In a written answer Sir DAVID ECCLES, Minister of Education, said that he agreed in general with the proposals of the Committee on Maladjusted Children on child guidance and special educational treatment. The rate at which these proposals could be carried out would depend on the availability of trained staff and on the extent to which we found it possible to finance developments of this kind. He was, however, considering at once with the Minister of Health the possibility of issuing some guidance on the organisation of the child-guidance service and on the training of staff for it.

Colouring Matters in Food

In a written answer to a question about the recommendations of the preservatives subcommittee of the Food Standards Committee on the use of colouring matters in foods, Mr. HEATHCOAT AMORY, the Minister of Agriculture, Fisheries, and Food, said that the Government had accepted the recommendation that only certain specified colours should be permitted in food and that the permitted list should at present be limited to the colours proposed in the committee's supplementary report. The list as a whole would be reviewed in not more than five years' time. Meanwhile, the Government would be prepared to consider individual colours for addition to or removal from the list if further information becomes available. The Government would arrange for certain colours, which traders regard as important but which on present information the committee have not been able to include in the list, to be investigated further as a matter of priority.

The Government accepted the recommendation that, except for marking purposes, colour should not be added to certain natural foods when sold raw or unprocessed. Special arrangements would, however, be made for citrus fruit in view of the difficulties of West Indian and other suppliers whose produce, because of climatic conditions, often did not ripen with a uniform appearance. These arrangements would permit the continued use of a colour on citrus fruit subject to safeguards for the consumer. The committee's recommendations on the labelling or description of processed foods containing added colour would be considered when a comprehensive review of the Labelling of Food Order was undertaken.

The Government had decided that specifications of purity should be prescribed for colours on the permitted list. Colour manufacturers and the other interests concerned would be consulted about the arrangements required.

Regulations giving effect to these decisions would apply to all food whether home produced or imported, and would be made as soon as practicable. In deciding when they would come into effect, the Government would bear in mind the need to give manufacturers and traders time to dispose of stocks of food produced in accordance with existing regulations. But the Government hoped that all who could do so would take steps immediately to use only colours on the permitted list.

Budget of National Health Service

Mr. A. W. J. LEWIS asked the Minister of Health if he was aware that due to the continued depreciation in the purchasing value of the £, the National Health Service had made in effect a financial cut in its annual budget; and if he would arrange for increased finance to be made available so as to increase the income of the service by 1*s.* 6*d* in the £?—Mr. TURTON replied: The amount provided from the Exchequer for the National Health Service in the estimates for the current financial year is substantially more than in the previous year. Moreover, an assurance has been given to hospital authorities that, if necessary, Parliament will be asked to provide additional sums to meet the cost of wage awards and price changes for which provision has not already been made.

Poliomyelitis Vaccine

Mr. S. S. AWBERY asked the Minister what supplies of anti-poliomyelitis vaccine he had in stock; whether it was sufficient to vaccinate all the children who desired it; how many children had been vaccinated; how many were on the waiting-list; whether all health authorities were participating in the scheme; and what steps were being taken to increase the supply of vaccine?—Mr. TURTON replied: Two litres; approximately 200,000 children in Great Britain will have been vaccinated by the end of June; a further 1,700,000 children have been registered for vaccination and will be given priority when vaccination is resumed in the autumn; all but two local authorities have participated; I understand that several manufacturers have plans for starting or increasing production of the vaccine.

Dental Students

In answer to a question Miss PATRICIA HORNSBY-SMITH said that the numbers of students entering English dental schools in the academic years 1953–54, 1954–55, and 1955–56 were 322, 406, and 501 respectively.

Epileptic Colonies

Mr. J. A. LEAVEY asked the Minister whether he would make a statement on the recommendation of the Committee on the Medical Care of Epileptics that the epileptic colonies should become part of the National Health Service?—Mr. TURTON: I do not propose to promote legislation for this purpose. I am, however, commending to regional hospital boards the committee's alternative proposal that they should make contractual arrangements with the colonies for rehabilitation services.

Mass Miniature Radiography

Dr. BENNETT STROSS asked the Minister whether he would make a statement on the policy he intended to follow with reference to mass X ray of the population and, in particular, for middle-aged groups and new entrants to industry; whether he had noted the value of mass X ray, not only in the detection of tuberculosis, but in pneumoconiosis among the general population; and whether he would replace the present 30-millimetre type of machine by the more modern 100 millimetre?—Mr. TURTON replied: The number of mass miniature radiography units has increased from 36 in 1948 to 75 at the present time, and the number of examinations, which are on a voluntary basis, has increased threefold. Voluntary surveys will be continued, and persons of middle age and new entrants to industry are being encouraged to use these facilities if they have not recently had a chest X ray. Six 100-millimetre cameras are being purchased for installing, on an experimental basis, at six hospital outpatient departments.

Dr. STROSS: Is the Minister aware that in some areas at least the examination of some sections of the population, such as miners, might well be more fruitful and useful if the 100-millimetre camera were used and, in the long run, perhaps more economical? Would he bear that in mind?—Mr. TURTON: I am anxious to undertake this experiment of the 100-millimetre camera. Some are already working; in fact nine hospitals are using them, but not on a large-scale basis for this purpose.

Local Health Authority Projects

Mr. C. W. GIBSON asked the Minister how many projects for capital expenditure put forward by local health authorities had been refused consent, or a starting date denied, during the year ending April, 1956; and what was the total amount of

capital involved in these decisions?—Miss HORNSBY-SMITH replied: Thirty projects at a total estimated cost of £340,000.

Dr. EDITH SUMMERSKILL: In view of the fact that the Minister showed sympathy with the Guillebaud report, the chief recommendation of which was to provide capital expenditure for hospitals, can the hon. Lady say why this attitude is adopted at this stage?—Miss HORNSBY-SMITH: The Guillebaud Committee repeatedly laid down the principle that, whilst many items might be desirable, they would have to conform to the general economic circumstances of the country, and that is the principle we are following here.

Social-security Reciprocity with Sweden

Replying to a question, Mr. J. A. BOYD-CARPENTER, Minister of Pensions and National Insurance, said that an agreement had been reached with Sweden on reciprocity in social security. Besides covering the benefits provided by the schemes of National Insurance, Industrial Injuries Insurance, and National Assistance in this country and the corresponding benefits in Sweden, the agreement would enable British families to draw Swedish family allowances as soon as they became civilly registered in Sweden. Legislation at present before the House would enable this country to make a corresponding concession in our scheme of family allowances. An important feature of this agreement was that British nationals who visited Sweden would be able to make full use of the Swedish health services. Agreements with other European countries had enabled British nationals to use the health services of those countries if they were working there; but Sweden was the first country outside the Commonwealth to offer full reciprocity with the United Kingdom by making its health services available for all British nationals, including tourists. The agreement required ratification, and the date of its operation would be announced later.

Protection of Children

Replying to a question, Major GWILYM LLOYD-GEORGE, Home Secretary, said that the terms of reference of the committee which he proposed to appoint[1] would enable it to study the problem of preventing or forestalling the suffering of children through neglect in their own homes and to make recommendations for any change in the law. Meanwhile he was arranging, in consultation with the Ministers of Health and Education, for a survey of the existing arrangements for coördination, and as a first step local authorities would be asked for up-to-date particulars of the arrangements operating in each area.

Mr. G. S. DE FREITAS: Is it not right that we should take account of the recent findings of the British Medical Association and the magistrates that family welfare work has been hindered by the number of people and organisations concerned?—Major LLOYD-GEORGE: Coördination is the better way to deal with this. Many local authorities have had coördinating committees, which have done good work. I entirely agree that coördination is most important, and I hope that the work of local authorities will be coördinated.

Replying to a further question, Major LLOYD-GEORGE said that, as at present advised, he would not feel justified in proposing in the case of this offence the quite exceptional step of raising above six months the term of imprisonment which magistrates had power to impose. From long experience he knew that the powers were sufficient but often were not utilised.

Health Education and the Effects of Alcohol

Replying to questions, Mr. DENNIS VOSPER, parliamentary secretary to the Ministry of Education, said that the Ministry's handbook of suggestions on health education, designed for teachers and parents, contained a passage on alcohol, and he had no doubt that most pupils received advice on this matter. The Minister of Education agreed with the Royal Commission that Teachers should be left free to handle it as they thought best. The handbook was about to be reissued, and this would contain a new passage referring to alcohol.

1. See *Lancet*, Feb. 11, 1956, p. 280.

Appointments

BROWN, ELIZABETH L., M.B. Edin.: senior registrar in chest medicine, Norwich and East Norfolk areas.

JELLIFFE, A. M., M.D. Lond., M.R.C.P., F.F.R., D.M.R.T.: consultant radiotherapist, Middlesex and Mount Vernon Hospitals, Northwood.

WALL, G. A., M.B. N.Z., F.R.C.S.: registrar in plastic surgery, regional plastic surgery and burns unit, West Norwich Hospital.

WALTERS, J. H., M.D. Camb., M.R.C.P.: part-time consultant physician, Hospital for Tropical Diseases, London.

Obituary

ALFRED HOPE GOSSE

T.D., M.A., M.D. Camb., F.R.C.P.

Dr. Hope Gosse, consulting physician to St. Mary's Hospital and to the Brompton Hospital, died on June 23. He was 73 years of age and was in his usual health until a fortnight before. He had lately remarked on his good fortune in being granted a bonus of three years over the allotted span of three score years and ten.

Alfred Hope Gosse received his early education in South Australia, but his later training was at Caius College, Cambridge, where he took his B.A. in 1907. He spent the clinical years of his medical course at St. Mary's Hospital, which he entered as a student in 1908 and from which he qualified in 1910. After filling the post of house-physician he became medical registrar in 1911. When war broke out in 1914 he spent a year or two as registrar to the 3rd London General Hospital (Territorial), but in 1916 he volunteered to go to Mesopotamia with 40 B.G.H. He was soon appointed officer commanding the officers' hospital at Beit Naama, where he ran a very efficient unit. He was thrice mentioned in despatches and was promoted brevet-major.

On his return home in 1919 he was elected physician to outpatients at St. Mary's Hospital. He had done some work with Sir James Mackenzie, and from the start he decided to specialise in diseases of the heart and lungs. This was furthered by his election to the staffs of the Brompton Hospital and of the King Edward VII Sanatorium, Midhurst. He was elected F.R.C.P. in 1923. Between the two world wars Gosse carried on a large consulting practice, though he never let it interfere with the faithful discharge of his hospital duties. He was a careful and accurate clinician, and a very acceptable teacher. Large numbers of students used to attend his clinic at the Brompton Hospital, where his clear and dogmatic teaching was much appreciated. During the late war he spent a large part of his time at St. Mary's Hospital, doing a great amount of teaching and encouraging the students by his example and advice. Though working in the Emergency Medical Service he refused to take any remuneration. In 1947 he retired from active hospital work, but he continued in private practice till three years ago.

In his prime Gosse was one of the leading cardiologists in this country. His care and conscientiousness inspired confidence in his judgment; his kindness and sympathy gave the patients hope. His long connection with the Medical Sickness Society gave him an unrivalled knowledge of the incidence of disease among doctors, and the few papers he wrote on that subject are of exceptional value.

In 1933 he was made president of the Harveian Society, but he took an even greater interest in the Medical Society of London, of which he was president in 1942 and had acted as honorary treasurer for the last 22 years. A good mixer, he was an oarsman and tennis-player in his youth, and in later life he enjoyed watching a match at Lord's or spending a day at Goodwood.

One of his friends has written: "in a long life I have never met a more fair-minded, entirely upright man." Another, T. C. H., speaks of his clear purpose and integrity.

"Few physicians in London can have had a greater number of true friends than he; and his complete honesty and sincerity made all who knew him trust him to the full. He was always on the look-out to help others and always careful to do so unobtrusively. Kindness and hospitality were part of his very nature, and there are many of his juniors who owe

him much, both in practical ways and for his interest in their welfare and his common-sense advice and guidance. Gosse had a direct and clear approach to problems. His way of brushing aside non-essentials often seemed at first too simple and blunt, but in the end often proved to be the best. He had, despite his forthright opinions and firm way of making decisions, a sensitive and even diffident nature, and he could be easily hurt and distressed if he thought he had been unfair to others or had been treated with discourtesy or dishonesty. He was incapable of deception himself and hated it in others. His modesty made him a man who did not like outward show and he could never tolerate hypocrisy. He was afraid of giving others trouble of any sort, but would go to any length to do things for them. As a physician he had a clear idea of what he meant to achieve; and he did not allow too many doubts to weaken his conclusions, so that he was able to give his opinion with a clearness and force that was greatly appreciated both by patients and doctors. His teaching was direct and his handling of patients set an example of gentleness and humour which his students remember with gratitude."

In the words of Sir Zachary Cope, to whom we are indebted for much of this memoir, he was "a most faithful, absolutely reliable friend, a man who scarcely ever spoke ill of anyone, a man to whom one could trust one's last penny and one's reputation. There are many who will feel that some virtue has gone out of them, now that Gosse has departed."

IAN MURRAY BURDON

M.B. Glasg., F.R.C.S.E.

Mr. Ian Burdon, visiting surgeon to the Victoria Infirmary, Glasgow, died in hospital on June 16. He was in his 56th year.

He received his early education at the Glasgow High School and graduated in medicine at Glasgow University in 1923. After house-appointments at the Victoria and Western Infirmaries he returned in 1926 to the Victoria Infirmary, where he remained, becoming surgeon in charge of wards in 1947.

A colleague writes:

During his earlier years Ian Burdon worked with Mr. Robert Carslaw, the late Mr. Robert Tennent, and the late Mr. Norman Davidson, all accomplished general surgeons; and during his thirty years' association with the Victoria Infirmary he similarly kept his surgical interests wide, though the field of biliary surgery claimed his special attention and study. Before the inauguration of the health service, he did a great deal of emergency surgery in the smaller hospitals in the West of Scotland such as Dunoon and Rothesay, while in addition he was surgeon for a number of years to the Glasgow Homœopathic Hospital.

His surgery was characterised by great facility, for he had the artistic temperament and was a superb craftsman. He was not so much an innovator as an improver and refiner of existing methods, and his results could hardly be bettered. His opinion was widely sought throughout Glasgow and the West of Scotland. He published little, but he turned his artistic talent to account in his *Atlas of Anatomy for Nurses* published in the '30s. He was also one of the first surgeons in Scotland to realise the importance of the cine-camera in recording operative procedures and teaching students. Many of his films were demonstrated before the Southern Medical Society, of which for a time he was president, and they will be long remembered.

He was a modest, kindly man with a quiet, charming manner and a great capacity for friendship. His death leaves a wide gap in the surgical ranks in Glasgow, where he was honoured and loved.

Mr. Burdon leaves a widow and two children.

Births, Marriages, and Deaths

BIRTHS

JAGO.—On June 21, at Charing Cross Hospital, London, to Dr. Margaret Jago, wife of Douglas Hewitt, a second son—Adrian.

MARRIAGES

HOPKINS—WOOLNOUGH.—On June 16 at St. Luke's Church, Duston, Northampton, Denis Hopkins, M.B., to Hilda Woolnough, of Woodlees, Weedon Road, Northampton.

Notes and News

THE M.R.C.

THE Medical Research Council, like a well-rooted tree, has ramified prodigiously since, in 1920, it was planted in the plot occupied since 1913 by the Medical Research Committee. The luxuriant foliage on most of its branches conceals from most eyes the supple wood beneath. Those who would like to see more of this may turn to a pamphlet,[1] just published, which shows the structure in simple outline.

REMUNERATION OF SENIOR HOSPITAL MEDICAL OFFICERS

COMMITTEE B of the Medical Whitley Council has agreed that, in accordance with an Industrial Court award,[2] the remuneration of S.H.M.O.s shall be increased by £75 a year as from April 26 this year. The new scales are as follows:

Main scale.—£1575 × £50 to £2025.
Scale for those appointed at age 30 or less.—£1475 × £50 to £2025.
Scale for those appointed at age 31.—£1525 × £50 to £2025.

ST. THOMAS'S HOSPITAL THROUGH EIGHT CENTURIES

THE history of St. Thomas's Hospital, London, is illustrated by an internal exhibition of archives in the grand committee room of the hospital which continues until 1 P.M. this Saturday. The records of the hospital begin in the 13th century and they include early maps and deeds, accounts, minute-books, and photographs. On show are autographed letters from Queen Elizabeth, Oliver Cromwell, and Charles II; that from Oliver Cromwell recommends, in curious grammar, the appointment of "a man thoroughly tried in ye service of ye state, & found able & faithfull in his profession," but despite this testimonial the candidate was unsuccessful. A salary book, 1657–77, contains the signature of Thomas Hollier, who operated on Samuel Pepys. The Treasurer's weekly accounts in 1704 include the payment of 3*s.* 4*d.* to Mr. Ferne, one of the surgeons, for taking off a leg, and "Paid the Helper in the Kitchen as vsual 3*s.* 4*d.*" There are the orders for "cubbs" drawn up on Feb. 12, 1702 (Old Style). The more official title was "covenanted servants," but students were first mentioned as "cubbs" towards the end of the 17th century (in 1699 the rule was made that they were not to keep their hats on in the wards), and the regulations of 1702 mark the formal beginning of the medical school. Intending "cubbs" had to produce a testimonial that they had served a surgeon for five years and that they were of sober life and conversation. One cannot imagine the side-whiskered, earnest young men, receiving their awards in a print of an early 19th-century prize-giving, being other than sober in life and conversation. But among the fine pewter tankards on display are those of the students' hall.

The clerk's diary records the first patient to die in the hospital "from the effects of chloroform"—on Oct. 10, 1849. A letter from Florence Nightingale in 1875 expresses strong disapproval of a proposal that ward-rounds should be made in the afternoon. In pride of place, of course, is the Letters Patent of Edward VI in 1551, but most fascinating are the lesser records, such as the survey of farms owned by St. Thomas's in 1774, which describes one tenant as "a Sot." The exhibition has been arranged by the Archivist.

NEOHIPPOCRATIC MEDICINE

THE third International Congress of Neohippocratic Medicine was held on May 20–22 at Montecatini and Florence, under the presidency of Prof. C. Frugoni (Rome). The object of this congress, as of the previous ones, was to study the combination of modern technical medical advances with the perennial Hippocratic principles of consideration of the whole man as a person in his internal dynamism and his special environment.

The first day was devoted to a review of the constitutional factors of predisposition to cardiovascular disease, tuberculosis, and cancer.

The second day was devoted to the treatment of disease by methods acting on the "whole man"—the old "Airs, waters and places" of Hippocrates. Papers were read on the systemic, constitutional action of mineral waters, various physical procedures, and the psychological organisation of health resorts.

1. Medical Research Council: Constitution and Functions. Published by the council, 38, Old Queen Street, London, S.W.1. Pp. 16.
2. See *Lancet*, May 12, 1956, p. 699.

The third day was devoted to the personality, duties, and social rôle of the physician. The congress expressed the wish for a more general application of the Hippocratic oath at graduation and for the creation of chairs of history and philosophy of medicine, with the object of helping the synthesis of medicine and the humanistic outlook in the practice of the physician.

More than four hundred physicians attended the congress. British participants were Sir Horace Evans, who read a paper on the constitutional predisposition to cardiovascular disease, and Prof. A. P. Cawadias, vice-president of the congress, who reported on the developments in the science of constitutional types—biotypology.

At the end of the congress a permanent International Committee of Neohippocratic Medicine was instituted. Much of the success of the congress was due to the energy of the president and to the activities of the secretaries, Prof. J. Delore (Lyons) and Prof. D. Scalabrino (Montecatini).

University of Cambridge

At a congregation on June 7 the following degrees were conferred:

M.D.—*A. C. Elithorn, Rodney Finlayson, W. D. Foster *I. W. de D. Gregory, H. E. Lockhart-Mummery, P. K. Robinson, C. E. D. Taylor.

M.B.—M. H. Heycock, D. L. Miller, Helen J. Pegg.

* By proxy.

University of London

Dr. K. R. Hill, professor of pathology in the University College of the West Indies, has been appointed to the chair of pathology tenable at the Royal Free Hospital School of Medicine.

Professor Hill graduated B.SC. with first-class honours in the University of London in 1932, and qualified M.R.C.S. from Westminster Hospital in 1937. He subsequently graduated M.B. in 1943 and M.D. (pathology) in 1946. Throughout the 1939–45 war he served in the R.A.M.C. as a specialist pathologist, with the rank of major. He held a Rockefeller fellowship in 1947–48. He was appointed assistant pathologist to the Royal Victoria Infirmary, Newcastle upon Tyne, and lecturer in pathology at King's College, University of Durham. Before going to the West Indies he was on the staff of the pathology department of Johns Hopkins Hospital, Baltimore. He is a member of the W.H.O. Expert Consultants' Panel on Treponematoses. His publications include accounts of work on yaws and on liver disease in Jamaican children.

The title of professor of human metabolism has been conferred on Dr. C. E. Dent in respect of his post at University College Hospital Medical School.

Dr. Dent graduated B.SC. in 1931 and PH.D. in 1933, in the University of London. He engaged in research work in organic chemistry at the Royal College of Science from 1931 to 1934 and with Imperial Chemical Industries from 1935 to 1937. In 1939–42 he undertook secret chemical war work, and in 1942 he was consultant in chemistry to the War Office. He qualified M.B. from University College Hospital in 1944, gaining the M.R.C.P. in the same year. After qualifying he was house-physician to Sir Thomas Lewis, and for the next two years he was assistant on the medical unit at University College Hospital Medical School. In 1946–47 he held a Rockefeller travelling fellowship in the U.S.A. Returning to his appointment in London, he was elected Foulerton research fellow of the Royal Society, and in 1949 he graduated M.D. In 1951 he took up his present post of reader in medicine at University College Hospital Medical School. He was elected F.R.C.P. in 1954. Dr. Dent's many investigations have been concerned predominantly with the metabolism of calcium and of amino-acids.

University of Bristol

At the final examination for the degrees of M.B. CH.B. the following were successful:

Pauline F. Haswell, D. H. Wright (with second-class honours); Miriam M. Alderwick, Babatunde Oladipo Amure, Elizabeth M. F. Andrews, J. H. Andrews, J. C. Bailey, E. P. Beck, W. E. Benney, B. T. A. Clarke, Ruth E. A. Coles, H. E. Cramp, J. D. Davison, K. M. Evans, Irene E. Gibbs, P. M. Gill, C. L. G. Hale, A. F. Hickson, A. L. Horton, Rachel M. Hulbert, A. T. Lloyd, Sheila M. McClements, June M. McLeod, Terence Morley, R. W. Morris, Anezionwu Nwankwo Okoro, K. M. Parry, Weekakkodige Fredrick Perera, C. K. Protheroe, M. J. Rose, W. J. Stephen, S. J. Strong, J. P. Telling, M. J. Watson, A. H. E. Williams, Mary B. Wilson, C. H. Wood.

University of Liverpool

As a tribute to Sir Henry Cohen, professor of medicine in the university, the family of the late Sir Montague Burton has given £50,000 to the appeal for £500,000 which the university launched on June 25.

Ministry of Health Appointment

Dame Enid Russell-Smith has been appointed deputy secretary to the Ministry of Health in succession to Sir Frederick Armer, who is to retire next November.

General Medical Council

The next session of the Medical Disciplinary Committee is to begin on Tuesday, July 17, at 10.30 A.M.

Institute of Child Health

The Alex Simpson Smith lecture for 1956 will be given at the Hospital for Sick Children on Tuesday, July 17, at 5 P.M., by Dr. William T. Mustard, of Toronto, whose subject will be the Surgical Correction of Total Anomalous Pulmonary Venous Drainage. Tickets may be had from the dean, Institute of Child Health, Hospital for Sick Children, Great Ormond Street, London, W.C.1.

More Mental Nurses

Mr. R. H. Turton, the Minister of Health, speaking on June 23 to the Association of Hospital Matrons, said that in the first quarter of this year there was an increase of 270 nurses in the mental hospitals and 175 in the mental-deficiency hospitals. The most welcome feature of all in his view, said the Minister, was the increase in student nurses. In mental hospitals there were 143 (10%) more male student nurses, and 109 (5%) more female student nurses. In mental-deficiency hospitals, the increase in male student nurses was 16 (6%) and of female student nurses 36 (8%). These increases had occurred before the recent salary settlement.

Royal Society of Tropical Medicine and Hygiene

At this society's annual meeting on June 21, Prof. R. M. Gordon, the president, presented the Manson medal to the widow of the late Brigadier J. A. Sinton, F.R.S., awarded in recognition of his outstanding work on malaria and other tropical diseases while serving in the Indian Medical Service. Sir Leonard Rogers, F.R.S., received the Laveran gold medal of the Société de Pathologie Exotique for his pioneer work—also while in the Indian Medical Service—on such fundamental studies as the treatment of amœbiasis with emetine, the treatment of leprosy with chaulmoogra derivatives, and the epidemiology and control of leishmaniasis.

Mental Deficiency: Laws and Administration

At a conference to be held by the National Council for Civil Liberties on Saturday, June 30, a report will be given on the council's six years' work on legal aspects of the care of mental defectives. Reference will be made to cases of lengthy detention brought to an end by the council's intervention, and proposals will be put forward "to deal with the position of a large number of people whose detentions would appear to be illegal, in consequence of the High Court decision in the Kathleen Rutty case." The sessions will take place at the Beaver Hall, Garlick Hill, London, E.C.4, at 2.30 P.M. and 6 P.M., and the opening paper (What is Mental Deficiency?) will be given by Dr. Bruce Cardew.

Diary of the Week

JULY 1 TO 7

Monday, 2nd

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. T. E. Lowe (Melbourne): Management of Congestive Cardiac Failure.

Tuesday, 3rd

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.15 P.M. Dr. D. A. Denton (Melbourne): Regulation of Sodium ion Content in Sheep wtih Parotid Fistulæ.

Wednesday, 4th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. E. G. Slesinger: Sir William Arbuthnot Lane—A Tribute. (Arbuthnot Lane lecture.)

POSTGRADUATE MEDICAL SCHOOL
2 P.M. Dr. R. W. Riddell: Mycology.

Thursday, 5th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Dr. Ivan de Burgh Daly, F.R.S.: Some Intrinsic Mechanisms of the Lung. (Bertram Louis Abrahams lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5.30 P.M. Prof. W. V. Mayneord, D.SC.: Recent Scientific Development in Radiotherapy.

UNIVERSITY OF LONDON
5 P.M. (University College Hospital Medical School, University Street, W.C.1.) Dr. Naguib Mahfouz (Cairo): Urinary Fistulæ in Women.

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5 P.M. Dr. J. D. Spillane: Developmental Abnormalities in the Region of the Foramen Magnum.

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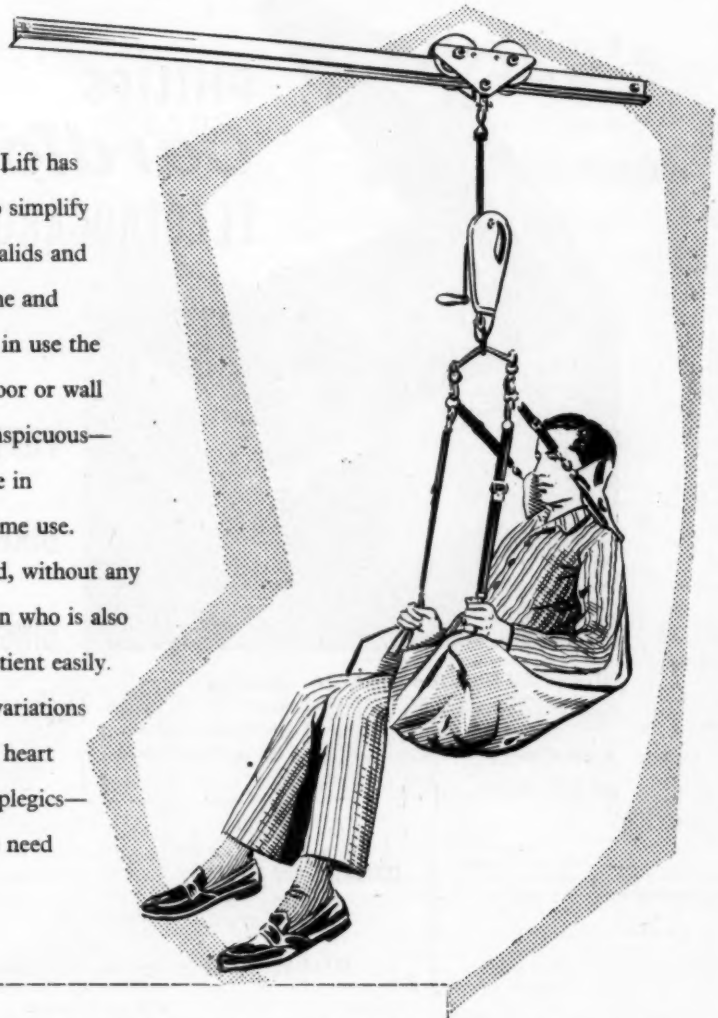

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	per oz.
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	grm. per oz.
Fat (by acid hydrolysis)	1.76
Protein (N x 6.25)	3.18
Carbohydrate	20.53
	mg. per oz.
Iron	5.0
Calcium	120.0
Phosphorus	110.0
Trace Elements: Zinc	1.0
Trace Elements: Copper	0.1
Trace Elements: Manganese	0.1

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Fat (by acid hydrolysis)	2.0
Protein (N x 6.25)	14.0
Carbohydrate	72.5
Mineral Matter	2.6
Fibre	0.4
Moisture	8.5
	per oz.
Vitamin D	600 I.U.
Vitamin B_1 (as Aneurin Hydrochloride)	0.17 mg.

	grm. per oz.
Fat (by acid hydrolysis)	0.57
Protein (N x 6.25)	3.98
Carbohydrate	20.59
	mg. per oz.
Iron	5.0
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Phosphorus	100.0
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Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling-greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: Northampton 4354 (3 lines)), who can be seen in London by appointment.

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Academic and Educational

UNIVERSITY OF LONDON

GRANTS FOR RESEARCH

Applications are invited from members* of the University and teachers in Schools of the University for grants from the Central Research Fund to assist specific projects of research and for the provision of special materials and apparatus. Grants are not made for normal maintenance.

Applications must next be received not later than 31st August. Forms of application and further particulars may be obtained from the Secretary to the Central Research Funds Committee, University of London, Senate House, London, W.C.1.

*Members of the University are defined by Statute as the Chancellor, the members for the time being of the Court and of the Senate respectively, the Professors and Readers and other Teachers of the University during their tenure of office, the graduates and the students.

UNIVERSITY OF LONDON

A LECTURE on "Urinary Fistulæ in Women" will be given by Dr. NAGUIB MAHFOUZ (Cairo) at 5 P.M. on 5TH JULY at University College Hospital Medical School, University-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

THE UNIVERSITY OF SHEFFIELD

A REFRESHER COURSE for General Practitioners will be held during the week beginning MONDAY, 24TH SEPTEMBER. The fee is 5 guineas, and accommodation at 1 of the University's Halls of Residence can be arranged at a moderate additional charge. N.H.S. practitioners are (subject to certain conditions) eligible to have the course fee paid on their behalf and to receive also certain allowances (travelling expenses, subsistence, locum fees).

As the number who can be accepted is limited, inquiries and applications (stating whether or not the latter are made under the Scheme for N.H.S. practitioners, and whether residential accommodation is desired) should be addressed as soon as possible to the Dean of the Faculty of Medicine, The University, Sheffield, 10.

J. A. RYLE MEMORIAL PRIZE

The Medical Association for the Prevention of War (London), offers a prize of £75 for the best essay submitted under the title :

"A World Approach to Human Survival and Health."

Full details may be obtained on application to the Secretary, M.A.P.W., 291, Burntwood-lane, London, S.W.17.

THE UNIVERSITY OF MANCHESTER. Darbishire HOUSE HEALTH CENTRE. Applications are invited for the appointment of ASSISTANT GENERAL PRACTITIONER at the Darbishire House Health Centre for the period 1st October, 1956, to 31st May, 1957. The work will entail assisting the 4 General Practitioners in the Centre, in which 12,000 patients are at present registered. The Health Centre is also used in the teaching of medical students of the University. Salary at the rate of £1000 p.a., with an allowance towards the cost of travelling expenses and superannuation.

Applications, which should include full particulars of qualifications, &c., must reach the Registrar, The University, Manchester, 13, not later than 21st July, 1956, and should give the names of not more than 3 persons to whom reference may be made.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for a post of LECTURER or ASSISTANT LECTURER IN PHYSIOLOGY to begin duties on 1st October, 1956, or as soon as possible thereafter. Salary scales : (*a*) for candidates holding a registered medical qualification—Lecturer : £1000–£100–£1700 ; Assistant Lecturer : £700–£100–£900 ; (*b*) for other candidates—Lecturer : £650–£50–£1350 ; Assistant Lecturer : £550–£50–£650. Commencing salary in either grade according to qualifications and experience, with F.S.S.U. provision and family allowance.

Applications (6 copies) should be sent to the Registrar, from whom further particulars may be obtained, by 21st July, 1956.

UNIVERSITY OF BIRMINGHAM. Faculty of Medicine. The University invites applications for the post of Whole-time LECTURER IN OBSTETRICS AND GYNÆCOLOGY (Grade II—Clinical) to work within the Professorial Unit and to begin duties as soon as possible. Salary scale up to £1700 a year according to age, qualifications, and experience. F.S.S.U. and family allowance.

Applications (6 copies), with names of 3 referees, should be sent by 28th July, 1956, to the Assistant Registrar, the Medical School, Birmingham, 15, from whom further particulars may be obtained. G. L. BARNES, Secretary.

The University, Birmingham, 15, June, 1956.

UNIVERSITY OF EDINBURGH. Department of Public HEALTH AND SOCIAL MEDICINE. Applications are invited for the post of ASSISTANT in the Department of Public Health and Social Medicine from graduates in medicine, biology, psychology, sociology, or any other social science. Among the duties of the successful applicant will be participation in research, and it is intended that he should also do some independent research. Salary scale £550–£50–£650 p.a., with superannuation benefit and family allowance where applicable.

Further particulars may be obtained from the undersigned, with whom applications, giving the names of 2 referees, should be lodged not later than 31st July, 1956.

CHARLES H. STEWART, Secretary to the University.

UNIVERSITY OF GLASGOW. Applications are invited for a LECTURESHIP IN ORTHOPÆDICS. Salary according to placement on University scale for clinical teachers. The final maximum is £1750 p.a. F.S.S.U. and family allowance benefits.

Applications (12 copies) should be lodged, not later than 21st July, 1956, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

Hospital Services : Senior Appointments

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Locum CONSULTANT RADIOLOGIST required, on a sessional basis, for period 16th July to 18th August.

Applications to Secretary of Hospital.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD.

(1) CONSULTANT PSYCHIATRIST (whole-time) Leavesden Hospital, Abbots Langley, Herts (2378 Beds—mental deficiency), and Abbots Langley Hospital (354 Beds—geriatric long-stay). Successful candidate may be required to act as Deputy Physician-Superintendent.

Applications before 30th July, 1956.

Hospital may be visited by direct appointment.

(2) OPHTHALMOLOGIST (Senior Hospital Medical Officer grade), St. Pancras School Treatment Centre, 25, Prince of Wales-road, N.W.5. Duties involve 3 visits a week (Monday and Wednesday afternoons and Thursday mornings) each 2½ hours a week clinical time, and candidates may apply for any or all of these sessions. Clinic may be visited by arrangement with the Divisional Medical Officer, 313–319, Harrow-road, W.9.

Applications before 1st August, 1956.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of Part-time CONSULTANT SURGEON in the Department of Ophthalmology. The appointment will be for 4 or 5 sessions per week and applicants must be in possession of the F.R.C.S. and have had considerable experience in ophthalmic surgery.

Applications (10 copies), together with the names of 3 referees, should be submitted to the undersigned within the next 21 days.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Lisle-street, Leicester-square, London, W.C.2. Applications are invited for the appointment of CONSULTANT DERMATOLOGIST to the Hospital. The appointment will be for 2 sessions, of which 1 may be at the Inpatient Department, and applicants must be Fellows or Members of the Royal College of Physicians of London.

Further details may be had from the Secretary to the Board of Governors to whom applications (10 copies), stating age, qualifications, and experience, with names of 3 referees, should be addressed not later than 11th August, 1956.

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens ANÆSTHETIST required for period of at least 6 months, commencing as soon as possible, in the Barrow and Furness Group of hospitals. Remuneration 31½ guineas per week.

Applications to Group Secretary, 105, Abbey-road, Barrow-in-Furness, immediately.

CHICHESTER GROUP OF HOSPITALS. Locum Con-SULTANT RADIOLOGIST required, 3 weeks, September, 1956.

Apply Group Secretary, 174, Broyle-road, Chichester.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT PSYCHIATRIST (whole-time), St. Andrew's Hospital, Thorpe, Norwich (1250 Beds). Hospital provides wide range of modern treatments and outpatient services at general hospitals in the area. Accommodation available. Salary £1500–£1950.

Applications (8 copies), stating age, experience and the names of 3 referees ; to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 9th July, 1956. Candidates invited to visit hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer) to the Salford Group of hospitals, mainly at Salford Royal and Royal Manchester Children's Hospitals. Good experience essential, higher qualification desirable ; appointee to work under general guidance of consultants and to live near main hospitals.

Application form from Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, to be returned by 16th July.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time or maximum part-time additional CONSULTANT ANÆSTHETIST to the Lancaster and Kendal Hospital Centre (mainly at Royal Lancaster Infirmary). Wide experience and higher qualifications essential ; appointee to live in area.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 16th July, 1956.

SCOTLAND. NORTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for a vacancy in the whole-time post of ASSISTANT CARDIOLOGIST on the staff of the Aberdeen General Hospitals with main duties at the Aberdeen Royal Infirmary. Applicants are required to have previous experience in Cardiology. The salary is within the scale £1500–£1950. Terms and conditions as laid down for medical and dental staff under the National Health Service (Scotland) Act.

Applications (12 copies), together with the names of 2 referees, should be submitted by 14th July, 1956, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. UNIVERSITY OF ST. ANDREWS. CONSULTANT PSYCHIATRIST/PROFESSOR OF PSYCHIATRY. Applications are invited from registered medical practitioners holding a higher qualification in psychiatry for a whole-time Consultant appointment in psychiatry. The successful applicant will be appointed by the Regional Hospital Board as Physician in charge of the Psychiatric Ward (22 Beds) and Outpatient Clinic at Maryfield Hospital, Dundee (a teaching hospital) and Physician-Superintendent of Dundee Royal Mental Hospital (a hospital of 100 Beds for acute mental disorders). He will also be appointed to the Chair of Psychiatry which the University is intending to institute during the academic year 1956/57.

Application forms and copies of a memorandum giving full information about the appointment and of the salary and conditions of service attached to it may be obtained from the Secretary, Eastern Regional Hospital Board, 430, Blackness-road, Dundee, to whom completed application forms are to be returned not later than 21st July, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments :—

CONSULTANT GYNÆCOLOGIST to the Johnstone Cottage Hospital. The appointment will be part-time and remunerated on the basis of 2 notional half-days per week. The commencing date for this appointment will require to be arranged later.

CONSULTANT UROLOGIST at the Victoria and Western Infirmaries, Glasgow. The appointment will be whole-time or part-time on the basis of 9 notional half-days per week.

CONSULTANT SURGEON in charge of wards at the Eastern District Hospital, Glasgow.

CONSULTANT SURGEON in charge of wards at the Victoria Infirmary, Glasgow.

The appointments will be part-time and remunerated on the basis of 7 notional half-days per week.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies for each appointment), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SOUTHEND GENERAL HOSPITAL. Locum Ortho-PÆDIC SURGEON required for duties in the Southend Group for approximately 7 sessions per week from 7th July to 4th August, 1956.

Apply immediately to J. C. FIELD, Secretary.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT ORTHOPÆDIC AND TRAUMATIC SURGEON required Clwyd and Deeside Hospital Management Committee area, 14th—28th July and 18th—31st August, 1956.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT ANÆSTHETIST required Pontypridd and Rhondda Hospital Management Committee area immediately.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

AUSTRALIA, ROCKHAMPTON HOSPITAL, Queens-LAND. Applications in writing are invited for appointment for 3 years to the following Part-time SPECIALIST appointments at the Rockhampton Hospital :—

Physician. 1 session of 3 hours per week divided into an outpatient session of 2 hours and an inpatient session of 1 hour. Salary £340 p.a.

E.N.T. 1 outpatient session of 3 hours per week and 1 inpatient session of 3 hours per week. Salary £680 p.a.

Rockhampton has a population of 42,000 and is the centre of a district of 90,000 in population.

Further particulars regarding position and opportunity for private practice will be forwarded upon request. Appointees to be not over 60 years of age.

Applications should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton. Applications close 31st August, 1956.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND. Applications are invited from persons who have held a medical degree for at least 5 years, for the position of Full-time ASSISTANT THORACIC SURGEON at the Dunedin Hospital.

The salary scale payable will be in accordance with the appointee's experience and qualifications and will be either :—

(a) Junior Specialist's scale : £1290–£1590 plus general wage increase of £81 7s. p.a., or

(b) Senior Registrar's scale : £985 13s.–£1100 13s., plus general wage increase of £81 7s. p.a.

The commencing salary within the applicable scale will be that determined by the Medical Officers' Salaries Grading Committee in accordance with the experience, qualifications and status of the appointee. The position is non-resident, is full-time and private practice is not permitted. Travelling expenses in accordance with those stated in the conditions of appointment are payable where the appointee signs an agreement to remain in the service for a period of 2 years. Conditions of appointment and a general outline of conditions in Dunedin, may be obtained on application to THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or High Commissioner for New Zealand, 415, Strand, London.

Applications, stating age, experience and qualifications, together with health and radiological certificates, should be in the hands of the undersigned not later than 10 A.M. on Monday, 6th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NEW ZEALAND. PALMERSTON NORTH HOSPITAL BOARD, PALMERSTON NORTH. Applications are invited for the position of MEDICAL SUPERINTENDENT. The duties include those of Medical Superintendent of a general hospital of 410 Beds with a visiting part-time staff. Applicants should have a surgical training. Duties are administrative with limited clinical work.

Salary is prescribed by the Hospital Employment (Medical Officers) Regulations, 1952. The successful applicant will be subject to grading procedure under the regulations and the commencing salary will be established within the following scales :—

Scale (*b*) £N.Z.1940–£2190.
Scale (*c*) £N.Z.1690–£1940.

The general wage increase of £N.Z.81 7s. is payable in addition to the above and a recent Government decision will mean a further increase in the above scales, the amount of which is to be decided shortly.

Conditions and memorandum of appointment are obtainable from the High Commissioner for New Zealand, 415, Strand, London, W.C.2.

Applications, giving full particulars as to age, qualifications and experience and accompanied by recent testimonials, should be addressed to the Secretary, Palmerston North Hospital Board, Palmerston North, New Zealand, and will be received until 12 noon on the 8th August, 1956.

Hospital Services : Junior Appointments

ANNIE McCALL MATERNITY HOSPITAL, Jeffreys-road, S.W.4. Applications are invited from registered Women medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON (post recognised for the D.Obst.R.C.O.G.). Appointment is for a period of 6 months, vacant 1st August, 1956.

Applications, stating age, qualifications with dates and nationality, accompanied by copies of 3 recent testimonials, should be sent to the Secretary, Annie McCall Maternity Hospital, not later than 4th July, 1956.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. (Acute general—309 Beds.) HOUSE PHYSICIAN. Post, vacant 24th July, 1956, recognised for pre-registration purposes.

Applications, stating age, experience, qualifications, and copies of 2 testimonials, to Hospital Secretary by 7th July, 1956.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. (Acute general—309 Beds.) HOUSE SURGEON (gynæcology and obstetrics). Post, vacant 18th July, 1956, recognised for pre-registration purposes.

Applications, stating age, experience, qualifications, and copies of 2 testimonials, to Hospital Secretary by 7th July, 1956.

BOW GROUP HOSPITAL MANAGEMENT COM-MITTEE. HOUSE PHYSICIAN for general medical wards. Post vacant 8th July, 1956.

Applications, stating age, qualifications, and experience, together with the names and addresses of 2 referees, to be sent to the Hospital Secretary, St. Clement's Hospital, 2A, Bow-road, E.3.

BROMPTON HOSPITAL, S.W.3. Applications invited for post of SENIOR REGISTRAR (whole-time) to the Cardiac Department from those who have completed at least the third year of their general medical training as a Senior Registrar. One who has completed or will shortly be completing the fourth year is preferred. Applicants from the Commonwealth of Senior Registrar status are eligible provided they intend to return abroad on completion of training. Appointment is for 1 year with eligibility for reappointment.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of 3 testimonials, by 10th July, 1956, to KENNETH A. F. MILES, House Governor.

CITY OF LONDON MATERNITY HOSPITAL, Hanley-road, London, N.4. OBSTETRIC HOUSE SURGEONS (2), recognised for M.R.C.O.G. Vacant 17th July and 5th August, 1956.

Application forms obtainable from Hospital Secretary, returnable as soon as possible.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in X-ray Department. Whole-time, non-resident appointment for 1 year in first instance, under supervision of consultant, will include teaching and some work in Mass X-ray Department. Possession of diploma desirable. Post vacant August, 1956. Hospital may be visited by direct appointment. Salary £850 p.a. in first year, £965 p.a. in second year, subject to terms and conditions of service of hospital medical and dental staff.

Application forms from and returnable to Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 7th July, 1956.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in Department of Physical Medicine, Central Middlesex Hospital (726 Beds). Whole-time or 9 sessions. Non-resident appointment. Appointment offers broad experience in all branches of this specialty and close contact with general medical problems. Possession of Part I of D.T.M. an advantage. Hospital may be visited by direct appointment.

Application forms from and returnable to Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 7th July, 1956.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. SENIOR HOUSE OFFICER (anæsthetics), whole-time, resident, for 6 months, renewable. Previous experience in anæsthesia essential. Post is recognised for D.A. and F.F.A.R.C.S.

Applications, with copies of 2 testimonials or names of 2 referees, to Medical Director by 14th July.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. Locum SENIOR REGISTRAR in Orthopædic and Traumatic Surgery required as soon as possible for 2–3 months. Resident or non-resident.

Apply to Medical Director immediately.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of SECOND CASUALTY OFFICER with duties in the Department of Orthopædic and Traumatic Surgery (Senior House Officer grade), vacant 12th July, 1956. Recognised for F.R.C.S. Salary £745 p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. HOUSE SURGEONS (2), pre-registration, required on the 23rd July and 2nd August.

Applications, stating age, nationality, qualifications and experience with the names of 3 recent referees, should be sent to the Secretary at the above address not later than 16th July.

DULWICH HOSPITAL (in association with King's College Hospital Medical School for teaching purposes), East Dulwich-grove, London, S.E.22. Applications invited for appointment as HOUSE OFFICER (general surgical duties). Recognised pre-registration post. Vacant 1st August or earlier, if available.

Applications, stating age, qualifications, &c., with copy testimonials, to the Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital by 10th July.

DULWICH HOSPITAL, East Dulwich-grove, London, S.E.22. SENIOR HOUSE OFFICER (casualty duties). Post recognised for F.R.C.S. examination. Vacant from 23rd July, 1956. Salary £745 a year. Non-resident. Day-time duty only.

Applications, stating age, qualifications and experience with copy testimonials, to the Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, as soon as possible.

EASTERN HOSPITAL (FEVERS), London, E.9. Applications for the 6-month appointment of registered RESIDENT HOUSE OFFICER (post now vacant) should reach Group Secretary, Hackney Hospital, E.9, by 6th July, quoting EH/HO. Duties may include some work in Chest Unit. Facilities for post-graduate study.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st September, 1956. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 11th July, 1956.

GERMAN HOSPITAL, London, E.8. Applications for the 6-month resident appointment from 23rd July of Pre-registration HOUSE PHYSICIAN (first or second post) should reach the Group Secretary, Hackney Hospital, London, E.9, by 11th July, quoting GH/PHP.

GERMAN HOSPITAL, London, E.8. (General—157 Beds.) Applications are invited for the 6-month resident appointment, now vacant, of Pre-registration HOUSE SURGEON, and should be sent immediately to Group Secretary, Hackney Hospital, London, E.9, quoting GH/PHS.

GUY'S HOSPITAL AND SOUTH EAST METRO-POLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill an established vacancy for a SENIOR REGISTRAR in Psychological Medicine to the Board of Governors of Guy's Hospital and the South East Metropolitan Regional Hospital Board. The successful applicant will be expected to spend a minimum of 1 and not more than 2 years in a Regional Board Hospital in the Bexley Group, on an exchange basis during a 4 year tenure of the post. The appointments will be made jointly by the bodies concerned and will be held in the first instance at Guy's Hospital. The post, which will be reviewed annually, is subject to the terms and conditions of service of hospital medical and dental staff (England and Wales), with duties commencing on 1st October, 1956.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 20th July, 1956.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-month resident appointment from 18th July of Pre-registration HOUSE PHYSICIAN (first post) should reach the Secretary at above address, by 6th July, quoting HH/PHP.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-month appointment of resident pre-registration HOUSE SURGEON (post vacant 16th July; recognised for F.R.C.S.) should reach the Secretary at above address, by 6th July, quoting HH/PHS.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. HOUSE OFFICER (gynæcology) required 1st September. Post recognised for M.R.C.O.G.

Applications, stating age, qualifications, experience, copies 2 recent testimonials, to Secretary, Board of Governors, by 9th July.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time REGISTRAR (orthopædics) required 1st August. Appointment tenable for 3 years, of which 2 will be spent at Hammersmith Hospital and the Postgraduate Medical School of London studying orthopædic and traumatic surgery and 1 year (resident if required) at Heatherwood Hospital, Ascot, studying long-term orthopædic surgery. Joint appointment with North West Metropolitan Regional Hospital Board.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 6th July.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON. 50 surgical beds, new operating theatre. Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON required. Duties mainly orthopædic with some E.N.T., casualty and emergency general surgery. New Operating Theatre. Outpatient and Casualty Departments. Preference given for applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited for the post of HONORARY DENTAL SURGEON.

Applications (28 copies) should be sent to the undersigned on or before 16th August, 1956. Testimonials are not required but the names of 3 persons willing to act as referees should be furnished. Sister MARY CLARE, Secretary.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of REGISTRAR in Ophthalmology at the Royal Eye Hospital. The post is tenable for 1 year in the first instance from 1st October, 1956, subject to reappointment.

Applications, stating age, education, qualifications, and experience with the names of 2 referees, should be sent to the undersigned by 6th July. S. W. BARNES, House Governor.

LAMBETH HOSPITAL, Brook-drive, S.E.11. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of SURGICAL REGISTRAR. The appointment is normally for 2 years, but is subject to review at the end of 1 year. It is recognised for the F.R.C.S. Duties include general surgery and genito-urinary work. The post is resident or non-resident, but if the latter the successful applicant will be required to sleep in on nights on duty.

Forms of application (enclosing stamped addressed envelope) from the Secretary of the Hospital, to whom all applications should be returned not later than 7th July, 1956.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. Applications are invited for the post of SURGICAL REGISTRAR. The appointment is for 1 year in the first instance and is non-resident. Previous experience in thoracic surgery essential.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should be forwarded at once to the House Governor, London Chest Hospital, E.2.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Skin Department. A higher qualification, although desirable, is not essential.

Applications (12 copies), together with the names and addresses of 3 referees, should reach the undersigned by 11th July, 1956.

H. BRIERLEY, House Governor.

MARLBOROUGH DAY HOSPITAL, 38, Marlborough-place, N.W.8. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. PSYCHIATRIC REGISTRAR for 8 sessions per week to commence in August. Successful applicant required to undergo personal analysis, which will be given free of charge. Clinic may be visited by direct appointment.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 10th July.

METROPOLITAN EAR, NOSE AND THROAT HOS-PITAL at ST. MARY ABBOTS HOSPITAL, Kensington, W.8. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (E.N.T.) required immediately. Resident appointment for 12 months.

Applications by 9th July, 1956, on forms obtainable from the Hospital Secretary (L. 86), St. Mary Abbots Hospital, Marloes-road, W.8.

MIDDLESEX HOSPITAL, W.1, AND NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for post of SENIOR REGISTRAR in Radiology to work approximately half-time at the Middlesex Hospital and half-time at the Royal Northern Hospital under the control of the North West Metropolitan Regional Hospital Board.

Forms of application obtainable from the Deputy Superintendent, The Middlesex Hospital, should be returned, naming 2 referees, by 21st July.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of REGISTRAR in the Department of Physical Medicine and Rheumatism.

Rules and application forms obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 12th July.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar. The appointment will be for 1 year and will be renewed in exceptional circumstances.

Applications, with names of 3 referees, to be sent to the undersigned not later than 2nd July, 1956.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospital, Queen-square, W.C.1.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (248 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR CASUALTY OFFICER, recognised for F.R.C.S. examination, for a period of 6 months, vacant 15th July, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee (Group No. 4), The Green, N.15.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. (158 Beds.) Applications are invited for the post of CASUALTY OFFICER (Senior House Officer), resident or non-resident. Non-resident candidates required to undertake certain night and week-end duties. Applicants must have had practical experience in administering anæsthetics and will perform this duty when required by the Consultant Anæsthetists.

Applications, stating age, qualifications, experience, and names and addresses of 2 referees, to reach Hospital Secretary by 9th July.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICER. Appointment will be made for 2 consecutive periods of 6 months commencing 1st September, 1956. First period as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned with copies of not more than 3 testimonials on or before 16th July, 1956.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Male or Female) graded Senior House Officer, at Shadwell, E.1, to become vacant 1st September, 1956. Candidates must have had experience in the treatment of sick children. The appointment will be for 1 year.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, not later than 16th July, 1956.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Male or Female), graded Senior House Officer, at Banstead, to become vacant 1st September, 1956. Candidates must have had experience in the treatment of sick children. The appointment will be for 1 year.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, not later than 16th July, 1956.

ROYAL FREE HOSPITAL GROUP. Hampstead General HOSPITAL AND ELIZABETH GARRETT ANDERSON HOSPITAL. Applications are invited for the post of REGISTRAR to the E.N.T. Department at the Hampstead General and Elizabeth Garrett Anderson Hospital. Applicants should be registered practitioners of not more than 10 years standing.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 27th July, 1956.

ROYAL FREE HOSPITAL GROUP. Dental Department. Applications are invited for the appointment of a full-time RESIDENT DENTAL REGISTRAR to work under the general supervision of the visiting consultant Dental Surgeons. Duties would be of a varied nature, including opportunities for surgical theatre work. The appointment is for 1 year in the first instance, duties to commence 1st September, 1956. Salary and conditions of service in accordance with the terms laid down by the Ministry of Health.

Applications should be made, stating qualifications, age and experience, and giving the names of 3 referees, to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 7th July, 1956.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House OFFICER (Casualty, Fracture and Orthopædic Departments), vacant 5th August. Recognised for F.R.C.S. 6 months resident appointment (not pre-registration). There is also a Senior House Officer in Casualty Department.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. OLAVE'S HOSPITAL, Lower-road, Rotherhithe, S.E.16. BERMONDSEY AND SOUTHWARK HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required at above Hospital. Salary £745 p.a., appointment initially for a period of 1 year from 1st July, 1956. Post recognised for D.A. and F.F.A.R.C.S.

Applications should be received within 1 week of this advertisement appearing, with full details and names of 2 referees, to the Secretary at above address.

ST. THOMAS'S HOSPITAL, London, S.E.1. Surgical REGISTRAR, for a period of 1 year in the first instance. There are 4 Surgical Registrar posts at St. Thomas's and in the Group, which are interchangeable, 2 of them being resident and 2 non-resident.

Applications, naming 2 referees, to the Clerk of the Governors by 7th July, 1956.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the post of SENIOR REGISTRAR to the Pædiatric Department at St. Mary's Hospital. Previous experience in pædiatrics is necessary; preference will be given to candidates holding the M.R.C.P. The successful candidate will be required to undertake duties in the Pædiatric Unit at St. Mary's Hospital as well as at the Constituent Children's Hospitals. The appointment will be for a first period of 12 months with effect from 24th August, 1956, the holder being eligible for reappointment; remuneration to be at "Senior Registrar" rates. The successful applicant may be eligible to participate in an exchange scheme with the Children's Medical Centre, Boston (Harvard University).

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details, and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 7th July, 1956,

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the post of Part-time REGISTRAR to the Psychiatric Department (5 notional half-days per week). Previous experience in psychiatry is necessary; preference will be given to candidates holding the D.P.M. The appointment will be for a first period of 12 months, with effect from 18th August, 1956; remuneration to be at "Registrar" rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 17th July, 1956.

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Qualified medical practitioners are invited to apply for the posts of HOUSE SURGEON, 2 vacancies. Provisionally registered candidates eligible. Appointments recognised for F.R.C.S. Appointments commence 1st August, 1956, are resident and limited to 6 months.

Applications by 9th July, 1956, on forms obtainable from the Hospital Secretary. (L.87.)

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (581 Beds.) Applications are invited for the post of CASUALTY OFFICER (Senior House Officer).

Applications, stating age, qualifications, experience and names and addresses of 2 referees, to reach Hospital Secretary by 9th July.

ST. JAMES' HOSPITAL, Balham, S.W.12. Senior House OFFICER (anæsthetics) required from 1st August. (Locum basis 1st–13th August, permanent appointment commencing 14th August.) Post recognised for D.A. and F.F.A.R.C.S.

Applications, stating age, qualifications, experience and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address by 12th July.

ST. JAMES' HOSPITAL, Balham, S.W.12. Part-time CLINICAL ASSISTANT (E.N.T.) required for 2 sessions per week (Monday morning and Thursday afternoon). Salary £175 p.a. per session.

Applications in writing, stating age, qualifications, experience, and names of 2 referees, to Group Secretary at above address by 11th July.

ST. JOHN'S HOSPITAL, St. John's Hill, S.W.11. Senior HOUSE OFFICER, vacant mid-August. Duties mainly in Geriatric Department, with some orthopædic work. Post offers excellent experience in these 2 fields. Particularly suitable for one working for higher qualifications.

Apply Medical Superintendent, with copies of 2 recent testimonials.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Lisle-street, Leicester-square, London, W.C.2. Applications are invited for the appointment of Whole-time SENIOR REGISTRAR. Candidates should have special experience in dermatology and possession of a higher qualification is desirable.

Applications addressed to the Secretary to the Board of Governors, stating age, qualifications, and experience with names of 3 referees, should be received by 21st July, 1956.

ST. LEONARD'S HOSPITAL, London, N.1. (General— 192 Beds.) Applications are invited from registered or provisionally registered medical practitioners for the post of HOUSE PHYSICIAN for 6 months commencing 18th July, 1956.

Applications, with 2 recent testimonials, to be sent to the Hospital Secretary by 14th July, 1956. Applications may be sent in pending the qualifying examination results being known, and provided these are available at the date of interview.

SOUTH WESTERN HOSPITAL, Landor-road, S.W.9. LAMBETH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited (preferably from women candidates) for the post of HOUSE SURGEON (pre-registration) at the above Hospital. Duties include general surgery, and the successful applicant will also be required to provide relief for leave of the House Surgeon at the Annie McCall Maternity Hospital.

Application forms can be obtained from the Secretary at the Hospital.

WHITTINGTON HOSPITAL, London, N.19. Registrar in Clinical Pathology required at Group Laboratory; some night and week-end duty. Free accommodation when on duty. Post vacant 10th September, 1956. Laboratory may be visited by appointment with the Group Pathologist.

Application forms obtainable from, and returnable to, Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, by 9th July, 1956.

WIMBLEDON HOSPITAL, Thurstan-road, Copse Hill, S.W.20. RESIDENT HOUSE SURGEON (not pre-registration). New post. Salary £525 p.a.

Applications, stating age, experience and qualifications, with copies of recent testimonials and the names of 2 referees, should be sent to the Secretary at above address.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICERS (anæsthetics), 1 at St. Nicholas Hospital, Plumstead, vacant 16th July, and 1 at Memorial Hospital, Woolwich, vacant 18th August. Both posts recognised for F.F.A.R.C.S. and are for 6 months in the first instance and may be renewed. Possession of D.A. an advantage.

Apply to Group Secretary, Memorial Hospital, Shooters Hill, Woolwich, S.E.18.

WANSTEAD HOSPITAL, Hermon Hill, London, E.11. (191 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST, graded Senior House Officer, vacant 21st July, 1956. Salary £745 p.a., less £150 p.a. for board, lodging, &c. Recognised for the F.F.A.R.C.S. and D.A.

Applications, stating age, qualifications and experience together with copies of 2 recent testimonials, should be sent immediately to the Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 23rd July, 1956. The appointment is recognised for the D.Obst.R.C.O.G.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications invited for post of SENIOR RESIDENT AND CASUALTY OFFICER (Male), Registrar grade, for 1 year in first instance from 1st October, 1956. Board residence £218 p.a.

Applications (8 copies), with names of 2 referees, to House Governor by 7th July.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications are invited for post of RESIDENT MEDICAL OFFICER (Female) at Parkwood Auxiliary Hospital, Swanley, Kent, for 1 year in the first instance and renewable. Graded as Junior Hospital Medical Officer. A deduction of £170 p.a. will be made from salary for board-residence. The post offers opportunity for study.

Applications (4 copies), with names of 2 referees, to House Governor.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. WOODEND GENERAL HOSPITAL. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the Thoracic Surgery Department of the above Hospital. The post, which is non-resident, is subject to the conditions of service issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, and the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for appointments to existing vacancies as REGISTRARS in Surgery with main duties in the Aberdeen Royal Infirmary. The posts are whole-time ones and are non-resident. Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Group Secretary, Aberdeen General Hospitals, P.O. Box No. 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for appointments to existing vacancies as JUNIOR HOSPITAL MEDICAL OFFICERS in Surgery with main duties in the Aberdeen Royal Infirmary and Woodend General Hospital, Aberdeen. The posts are whole-time ones and are non-resident. Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Group Secretary, Aberdeen General Hospitals, P.O. Box No. 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the whole-time post of REGISTRAR in Chest Diseases in the Ashton, Hyde and Glossop Group and Oldham and District Group of Hospitals. The post offers wide experience in both outpatient clinics and pulmonary hospitals. Residential accommodation may be arranged.

Applications to the Group Secretary, Ashton, Hyde and Glossop Hospital Management Committee, Ashton-under-Lyne General Hospital, Ashton-under-Lyne, Lancashire.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital, Modern Pædiatric Unit, good neonatal and premature baby experience. Recognised for D.C.H. Vacant September.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration). Post vacant mid-July.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BASINGSTOKE, HAMPSHIRE. PARK PREWETT GROUP HOSPITAL MANAGEMENT COMMITTEE NO. 47. ROOKSDOWN HOUSE PLASTIC AND ORAL SURGERY CENTRE. PLASTIC SURGICAL REGISTRAR. The appointment is a whole-time one and some previous experience in plastic surgery is desirable.

Application forms (5 copies) may be obtained from the Group Secretary, Park Prewett Hospital, Basingstoke, to whom they should be returned within 14 days of the appearance of this advertisement. Applicants may visit the Hospital by arrangement.

BASINGSTOKE. PARK PREWETT HOSPITAL. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR PSYCHIATRIC REGISTRAR at Park Prewett Hospital (1490 Beds). Candidates should possess the D.P.M. and have had considerable experience in psychiatry. Residential accommodation is available to a single man.

Application forms can be obtained from the Group Secretary, Park Prewett Hospital, and should be returned not later than 14 days after the appearance of this advertisement. Applicants may visit the Hospital by appointment.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory with attendance at Branch Laboratory, Driffield. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Married accommodation available. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S. Vacant now.

Apply to Group Secretary.

BEDFORD GENERAL HOSPITAL. (437 Beds.) House SURGEON required (pre- or post-registration); recognised for F.R.C.S. The appointment offers exceptional opportunities for general experience in busy acute surgical units.

Applications, stating age, experience, nationality, copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BRIGHTON. ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road. Locum HOUSE PHYSICIAN and/or SENIOR HOUSE OFFICER required for the early part of July.

Applications, with the usual details, to be sent to the Administrative Officer as soon as possible.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required in the Thoracic Surgery Department, which is the Regional Thoracic Surgery Centre (120 Beds) for the South West.

Applications, with full particulars, should be addressed to the Group Secretary, Frenchay Hospital, Bristol, quoting "Thoracic."

BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol. HOUSE OFFICER required for the Tuberculosis Wards of the above Hospital. The Hospital is fully equipped for the modern treatment of pulmonary tuberculosis, including regular major thoracic surgery.

Apply Secretary, Ham Green Hospital, Pill, near Bristol.

BIDEFORD AND DISTRICT HOSPITAL. (51 Beds.) Applications invited for the post of HOUSE OFFICER from 1st September, 1956. Flat available for married officer.

Applications to Group Secretary, 19, Alexandra-road, Barnstaple, Devon.

BINGLEY, KEIGHLEY, SKIPTON AND SETTLE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (either sex) required for duty at the following hospitals in Skipton, Yorkshire (West Riding):—

Skipton General Hospital (Acute—64 Beds).

Raikeswood Hospital (Long Stay—143 Beds, Acute medical—28 Beds).

Cawder Ghyll Maternity Hospital (16 Beds).

Salary £745 p.a., less statutory deductions and £150 if resident. Accommodation for single person available at Skipton General Hospital.

Applications, with full particulars as to age, nationality, qualifications and experience, &c., and copies of testimonials, to be sent to Group Secretary, Hospital Management Committee, 17, St. John's Hospital, Keighley.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. SENIOR HOUSE OFFICER or HOUSE OFFICER (including pre-registration) required.

Apply to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Coventry Group No. 20, Stoney Stanton-road, Coventry**

REGISTRAR (pædiatrics), non-resident. Experience specialty essential. Recognised for D.C.H.

(2) **Stafford Group, 13, Foregate-street, Stafford**

REGISTRAR (surgery), resident. Duties mainly at Staffordshire General Infirmary (175 Beds) and Yarnfield Recovery Unit (32 Beds). Recognised for F.R.C.S. Experience surgery essential, higher qualification desirable.

(3) **Stoke-on-Trent Group, Princes-road, Stoke-on-Trent**

(*a*) REGISTRAR (pathology), at City General Hospital (845 Beds). Resident, recognised for Dip.Path. Experience in all branches of clinical pathology available.

(*b*) REGISTRAR (orthopædics) at Biddulph Grange Orthopædic Hospital (104 children's beds). Resident. Considerable experience orthopædic and traumatic surgery available. Excellent library facilities for study. Possibility of married accommodation.

(*c*) REGISTRAR (orthopædics) at Hartshill Orthopædic Hospital (78 Beds). Resident. Experience specialty essential. Excellent library facilities.

(*d*) REGISTRAR (orthopædics). Duties mainly at North Staffordshire Royal Infirmary (455 Beds). Experience specialty essential. Higher qualification an advantage.

Application forms from Group Secretaries, to be returned before 9th July, 1956.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER to work in the Clinical Pathological Department, vacant 11th July, 1956, for 1 year. Applicants should have held resident appointments in a children's hospital or a children's department of a general hospital.

Forms of application may be obtained from the House Governor and should be returned immediately.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. RESIDENT MEDICAL OFFICER (Senior House Officer), vacant beginning of July. General Hospital. Good experience. 5 other resident medical staff. Resident charge £157 p.a.

Applications, stating age, qualifications and experience, and names of 2 referees, to Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL.
HOUSE SURGEON, vacant beginning of July.
HOUSE PHYSICIAN, vacant mid-July.
Pre-registration posts. General Hospital offering good experience. 5 other resident medical staff.
Applications, with copies of 2 recent testimonials or names for reference, to Medical Superintendent.

BIRMINGHAM (near). MIDLAND CENTRE FOR NEUROSURGERY, Holly-lane, SMETHWICK, near BIRMINGHAM. RESIDENT SENIOR HOUSE OFFICER, vacant August, 1956. This is a new hospital entirely devoted to neurology and neurosurgery, within easy reach of Birmingham. Salary on national scale, less deduction for board, lodging, &c.
Applications, with names of 2 referees, to the Group Secretary, West Bromwich and District Hospitals Management Committee.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant 1st September, 1956. Recognised for D.Obst.R.C.O.G. Departmental beds 69.
Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BOLTON DISTRICT GENERAL HOSPITAL. (604 Beds.) RESIDENT HOUSE PHYSICIAN. Vacant 6th August, tenable for 6 months and recognised under the Pre-registration Service scheme.
Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

BOSTON GENERAL HOSPITAL. (80 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynæcology) required with relief duties in the Casualty Department. Post becomes vacant 1st August. Appointment for 1 year in first instance.
Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment, vacant mid-July, of SENIOR HOUSE OFFICER (resident), orthopædic and casualty combined. The post is recognised for the F.R.C.S. examination and is normally tenable for 12 months.
Applications to the Hospital Secretary.

CHELMSFORD HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) to large surgical units, for a period of 12 months.
Applications, stating age, qualifications and experience, with recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD, ST. JOHN'S AND THE CHELMSFORD AND ESSEX HOSPITALS. Locum MEDICAL AND PÆDIATRIC REGISTRAR (resident) required to commence 3rd August, 1956.
Apply to the Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford, Essex.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Ophthalmological REGISTRAR (non-resident). Vacant 13th August. For 1 year in first instance, reviewable annually.
Apply, with full particulars and names of 3 referees, to Secretary by 14th July.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. SENIOR HOUSE OFFICER (resident) at Brookfields Hospital for Infectious Diseases, Poliomyelitis, and Tuberculosis, with other work to be arranged at Addenbrooke's Hospital. Appointment for 6–12 months from 1st September.
Applications, stating age, qualifications, and experience with dates, and copies of 3 testimonials, to Secretary, United Cambridge Hospitals, Addenbrooke's Hospital, Cambridge, by 14th July.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (A General Children's Hospital of 853 Beds.) HOUSE SURGEON (resident) for acute general surgery required for 6 months. Applicants must have completed 12 months Pre-registration Service.
Applications, stating age and qualifications together with 1 recent testimonial and the names of 2 referees, should be submitted to the Group Secretary by 7th July, 1956.

CARSHALTON. QUEEN MARY'S HOSPITAL FOR CHILDREN. (853 Beds.) SURGICAL AND ORTHOPÆDIC REGISTRAR required for duties which include 60 orthopædic beds and shared registrar responsibility for 60 acute and general beds. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.
Applications which should be made on forms obtainable from the Group Secretary, should be returned by 7th July, 1956.

CARDIFF. WHITCHURCH HOSPITAL. (800 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in Psychiatry (Male or Female) from practitioners who have held general house appointments. Opportunities exist for gaining experience in all branches of psychiatry. Salary according to Whitley scale, less £150 p.a. if resident.
Forms of application to be obtained from the Physician-Superintendent, to whom they should be returned, together with the names of 2 referees.

CARDIFF. ROYAL HAMADRYAD GENERAL AND SEAMEN'S HOSPITAL. RESIDENT SENIOR HOUSE OFFICER (surgical) required at above Hospital. Post covers 44 Beds—genito-urinary, general surgery, and outpatients. Department under care of Consultants from United Cardiff Hospitals.
Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in Pædiatrics at Llandough Hospital, Penarth. The post is a resident one and provides excellent experience for those entering general practice. Pædiatric experience desirable but not essential.
Application forms are available from the Secretary to the Board, at the Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the publication of this advertisement.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the following posts (pre- or post-registration appointments) for the 6 months commencing 1st August, 1956 :—
(1) ORTHOPÆDIC HOUSE OFFICERS (2 vacancies).
(2) GYNÆCOLOGICAL HOUSE OFFICER (post recognised for M.R.C.O.G.).
Applications, stating age, qualifications, and any previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) SENIOR HOUSE OFFICER to the Genito-Urinary Surgeon required from 2nd August, 1956. Post recognised for F.R.C.S. Salary in accordance with terms and conditions of National Health Service.
Applications, with names and addresses of 2 referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, immediately.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (404 Beds.) RADIOLOGICAL REGISTRAR. 1 of the 2 Registrar posts in the Diagnostic X-ray Department will become vacant at the end of September, 1956. Applicants must possess at least the D.M.R.(D), Part I.
Application forms may be obtained from the Group Secretary, Woking and Chertsey Hospital Management Committee, "Huntingdon," Guildford-road, Chertsey, Surrey. Completed forms must be returned by 20th July, 1956. The department may be visited by arrangement with the Senior Radiologist (Ottershaw 441). Hospital within easy reach of London.

CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER at Whittington Hall Hospital (400 Beds for mental defectives) and Scarsdale Hospital (125 Beds for mental patients). Small house available near Scarsdale Hospital. Ample opportunities for study. Previous experience in psychiatry not essential.
Applications, with names of referees, to the Group Secretary, Royal Hospital, Chesterfield.

CHESTERFIELD ROYAL HOSPITAL. (324 Beds. Recognised for the D.A. and F.F.A.R.C.S.) **SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time RESIDENT REGISTRAR (anæsthetics) with additional duties when required at other hospitals in the group. Experience in all types of anæsthesia, except for neurosurgery, can be obtained in this group of hospitals. Appointment for 1 year in first instance.
Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

CHICHESTER, SUSSEX. GRAYLINGWELL HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR (whole-time) at the above Hospital. Applicants should have had wide psychiatric experience, and possession of the D.P.M. or its equivalent is essential. The Hospital has an admission-rate of 1100 a year and there are 3 active Outpatient Clinics. There are Departments of Research, Neurology, Psychology and Social Service, and there is a modern Electro-encephalographic Unit.
Application forms, for which a stamped addressed envelope should be supplied, may be obtained from the Group Secretary, Graylingwell Hospital, Chichester, and 5 copies should be returned to him duly completed, not later than 14 days after the appearance of this advertisement.

COLCHESTER. ESSEX COUNTY HOSPITAL. (188 Beds.) Applications invited for post of HOUSE PHYSICIAN. First, second, third, or pre-registration post, tenable for 6 months.
Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLCHESTER. ESSEX COUNTY HOSPITAL. (188 Beds.) Applications invited for post of HOUSE OFFICER (surgical). First, second, third, or pre-registration post, tenable for 6 months.
Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CROYDON. MAYDAY HOSPITAL. (611 Beds.) Croydon GROUP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR CASUALTY OFFICER (Senior House Officer grade). Applications are invited for post which is vacant on 22nd July. Recognised for final F.R.C.S. examination. Particularly good for gaining experience in orthopædic and fracture work.
Application forms obtainable from Group Secretary, Hospital Management Committee, General Hospital, Croydon.

DERBY. CITY HOSPITAL. 2 House Physicians (pre-registration) or SENIOR HOUSE OFFICERS. 1 vacant 26th August, the other vacant 11th September.
Apply, stating full details with copies of 2 recent testimonials, to Medical Superintendent.

DERBY. CITY HOSPITAL. 2 House Surgeons (pre-registration) or SENIOR HOUSE OFFICERS (surgical). The posts are recognised for the F.R.C.S. 1 vacant 26th August, the other vacant 11th September.
Apply, stating full details with copies of 2 recent testimonials, to the Medical Superintendent.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (anæsthetics), now vacant. Recognised for D.A.

Apply immediately, stating full details with copies of 2 recent testimonials, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (E.N.T.), now vacant. Recognised for F.R.C.S. Duties include attendance at 2 other hospitals within the Group.

Apply immediately, with copies of 2 recent testimonials, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds. Recognised training post for F.R.C.S., otolaryngology.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (E.N.T.) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DONCASTER ROYAL INFIRMARY. (330 Beds. Recognised for training for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (orthopædics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for post of HOUSE PHYSICIAN at this busy Hospital, which has been approved for Pre-registration Service. The post, which becomes vacant 1st September, 1956, offers varied experience. 4 residents on the staff. Salary scale £425–£475–£525, according to experience.

Applications, stating full details, with copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (casualty). Post now vacant.
SENIOR HOUSE OFFICER (anæsthetics). Post now vacant.
HOUSE OFFICER (surgical), pre-registration. Post vacant July.

Apply, Group Secretary, Guest Hospital, Dudley.

DURHAM HOSPITAL MANAGEMENT COMMITTEE.

Dryburn Hospital, Durham (303 Beds)

HOUSE PHYSICIANS (general medicine). 2 vacancies. Approved pre-registration posts.

HOUSE SURGEON (general surgery). Approved pre-registration post, and recognised under the F.R.C.S. regulations.

SENIOR HOUSE OFFICERS. 2 vacancies. 1 in general surgery and 1 in a shared post covering E.N.T., eyes, and general surgery.

HOUSE PHYSICIAN required for Pædiatric Unit of 42 Beds. Approved pre-registration appointment and recognised for D.C.H.

General Hospital, Chester-le-Street (204 Beds)

HOUSE PHYSICIAN (general medicine). Approved pre-registration post.

SENIOR HOUSE OFFICER in General Medicine.

HOUSE SURGEON (general surgery). Approved pre-registration post.

All the above posts will be vacant on 1st August, 1956.

Apply, with names and addresses of 2 referees, to the Group Secretary, Dryburn Hospital, Durham.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry, East Suffolk Mental Hospitals, St. Clement's Hospital, Ipswich (450 Beds) and St. Audry's Hospital, Melton, near Woodbridge (1100 Beds) and associated general hospital outpatient clinics. There is a very active Outpatient Department and Electro-encephalographic Department at St. Clement's Hospital. Both hospitals are recognised for the D.P.M.

Applications, stating age, experience and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 16th July, 1956. Candidates are invited to visit the Hospitals by direct arrangement with Medical Superintendent, St. Audry's Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. (1) SURGICAL REGISTRAR, North Cambridgeshire Hospital, Wisbech. Post provides good training and experience in both general and orthopædic surgery. Appointment for 1 year, renewable for second year. Candidates invited to visit the hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

(2) REGISTRAR in Geriatrics, Norfolk and Norwich Group of hospitals (total geriatric beds 590). Main hospital is the West Norwich Hospital where the Geriatric Department is the pivotal point of the area service which is being developed on active lines under the Consultant Physician in Geriatrics. Appointment for 1 year, renewable for second year. Candidates invited to visit hospital by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 9th July, 1956.

EDINBURGH. PRINCESS MARGARET ROSE HOSPITAL. Applications are invited from registered medical practitioners for appointment of NON-RESIDENT SENIOR HOUSE OFFICER for 12 months commencing 1st October, 1956. National Health Service scale.

Applications, stating age, qualifications and experience, and names of 2 referees, to be sent within 14 days of this notice to Medical Superintendent, Edinburgh Central Hospitals, 18, Rillbank-terrace, Edinburgh, 9.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 5th August. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary, at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 1st July, for Orthopædic, E.N.T. and Eye Departments. Pre-registration post.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent immediately to Group Secretary at above address.

EPSOM, SURREY. WEST PARK HOSPITAL (for all stages of nervous and mental disorders). WEST PARK HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR in Psychiatry at above Hospital. Candidates may be of either sex. Single residential quarters available. All modern methods are practised and there are facilities for study for the D.P.M. Within easy reach of London.

Applications (5 copies) should be made on forms obtainable from the Secretary to the Hospital Management Committee at the Hospital, to whom they should be returned not later than 14th July, 1956.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the appointment of SENIOR HOUSE OFFICER in Clinical Pathology (resident), vacant now. The successful candidate will be responsible for emergency pathological and blood transfusion duties, and will work, under the Area Pathologist, in different branches of clinical pathology.

Applications, with names of 2 referees, to the Hospital Secretary.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female), resident preferred, in the Psychiatric Unit which consists of 180 Beds with 1600 admissions yearly and deals with acute treatable cases; it is recognised for the D.P.M. The appointment will be for 2 years in the first instance.

Applications, stating age, qualifications and experience and naming 2 referees, should be sent to the Medical Superintendent.

GLASGOW. VICTORIA INFIRMARY. Senior House OFFICER (general medicine), 2 posts. Applications invited from registered medical practitioners of not less than 2 years standing. The posts are for 1 year. Holders may be required to spend 6 months as Resident House Physician in the Cardiac and Metabolic Unit and 6 months, non-resident, with a general medical unit.

Applications, with names of 2 referees, to the Secretary, Board of Management for Glasgow Victoria Hospitals, 24, St. Vincent-place, Glasgow, C.1.

GRAVESEND AND NORTH KENT HOSPITAL. Locum ORTHOPÆDIC REGISTRAR required at above Hospital immediately until permanent appointment made. Salary £17 10s. per week.

Apply, with full details and testimonials, to Group Secretary, Medway and Gravesend Hospital Management Committee, 20, Star Hill, Rochester.

GREAT YARMOUTH AND GORLSTON GENERAL HOSPITAL, DENE SIDE, GREAT YARMOUTH. HOUSE SURGEONS (2), Male or Female, required immediately. These are pre-registration posts. Salary £425, £475, or £525 p.a., according to experience, less £125 p.a. for residence. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications and experience, with names of 2 referees, to Hospital Secretary.

GRIMSBY GENERAL HOSPITAL. Applications are invited for CASUALTY OFFICER (Senior House Officer grade) with some E.N.T. duties. Up-to-date medical library and reading facilities available.

Applications, with names and addresses of 2 referees, to Hospital Secretary.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Senior HOUSE OFFICER in Anæsthetics required. Post recognised for D.A. Salary £745 p.a., less £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Duties include attendance at busy Chest Clinic at the Royal Halifax Infirmary and non-tuberculous chest ward work. This post offers excellent facilities for the study of chest diseases. Salary £745 p.a. with deduction of £130 p.a. for board, residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in General Surgery required. Post vacant July. Salary £745 p.a., with deduction of £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ST. JOHN'S HOSPITAL. Senior House OFFICER in Geriatrics required. Good facilities for modern method of treating geriatric cases. Post vacant 1st August. Salary £745 p.a., with deduction of £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required. Post vacant 21st July, 1956.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. ORTHOPÆDIC REGISTRAR required for this group of hospitals. Work involves sessions at Harefield, Mount Vernon, and Northwood, Pinner and District Hospitals, together with 3 sessions at St. Vincent's Orthopædic Hospital.

Application forms obtainable from the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE PHYSICIAN (resident) for pædiatrics and general medicine. Post-registration post vacant 25th July, 1956.

Apply to Hospital Administrator by 12th July.

HASTINGS. ST. HELEN'S HOSPITAL (493 Beds). HOUSE SURGEON, resident, pre-registration post, vacant now.

Apply to Hospital Administrator.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general) (first, second, or third post). To commence 18th July, 1956. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Group Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON—general, gynæcology and obstetrics (first or second post). Recognised under F.R.C.S. regulations, pre-registration post. Duties to commence immediately.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required 1st September, 1956, at the above Hospitals for 1 year in the first instance. The post provides valuable all-round surgical experience and is recognised for F.R.C.S. The Hospitals may be visited by direct appointment.

Application forms obtainable from the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, and returnable by 17th July, 1956.

HOLT, NORFOLK. KELLING HOSPITAL AND DEPARTMENT OF THORACIC SURGERY. Applications are invited for the following posts.

(1) Locum JUNIOR HOSPITAL MEDICAL OFFICER (minimum of 4 months).

(2) SENIOR HOUSE OFFICER.

This Hospital (180 Beds) deals with tuberculous and non-tuberculous chest conditions and offers excellent experience in chest medicine and thoracic surgery.

Applications, stating age, sex, qualifications, nationality and experience, together with names of 2 referees, to the Group Secretary, Cromer Area Hospital Management Committee, Cliff Avenue, Cromer, Norfolk, who will be pleased to supply any other information concerning the appointments.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) 2 HOUSE SURGEONS required to commence duties early in July. The posts are recognised as pre-registration appointments and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) Applications are invited for the post of CASUALTY OFFICER. The post, which is resident, is graded Junior Hospital Medical Officer and is recognised under the Fellowship regulations. Duties terminate at 7 P.M. daily with 1 night weekly on call.

Applications for the appointment, which will be vacant on 1st September, 1956, should be accompanied by copies of 3 recent testimonials and addressed to—

H. J. JOHNSON, Group Secretary.

The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical), now vacant. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) Resident SENIOR HOUSE OFFICER (surgical) required for Major Thoracic Surgical Unit at the above Hospital.

Applications, stating age, nationality, qualifications and experience, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to Consultant General Surgeons, vacant on 27th July, 1956. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL, Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Resident Anæsthetist). The post, which becomes vacant on 20th August, 1956, and is normally of 1 years duration, is recognised for the D.A. and the F.F.A.R.C.S. examinations.

Applications, stating age and nationality, together with recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of SENIOR HOUSE SURGEON to the Fracture and Orthopædic Department. The post is graded Senior House Officer and is recognised for the F.R.C.S. examinations. The Department has 2 Consultants, about 60 Beds and a large outpatient attendance; it offers wide experience.

Applications, stating age, nationality and experience, together with copies of recent testimonials, to the Hospital Secretary.

ILFORD MATERNITY HOSPITAL, Eastern-avenue, ILFORD. There will be a vacancy for a SENIOR HOUSE OFFICER (obstetrics, and also entails care of some gynæcological beds) at the above Hospital on 17th August, 1956. Salary will be at the rate of £745 p.a., less emoluments. This post is recognised for training for the D.Obst. R.C.O.G.

Applicants should have been registered not less than 1 year and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Secretary, Ilford and
Barking Group Hospital Management Committee.
King George Hospital, Ilford.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue. There will be a vacancy for a HOUSE SURGEON, 15th July, 1956 (first or second post pre-registration), at above Hospital. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.

KETTERING AND DISTRICT HOSPITAL MANAGE- MENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Anæsthetics, vacant 3rd July, 1956. Recognised for D.A.

Applications, giving details of qualifications and experience and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, General Hospital, Kettering, Northants.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies

Anæsthetics

Duties in the Leeds A and B Groups. Recognised for F.F.A.R.C.S. and D.A. Resident.

Obstetrics and Gynæcology

Halifax General Hospital with additional duties at Halifax Royal Infirmary (100 obstetric and 35 gynæcological beds). Recognised for M.R.C.O.G.

Psychiatry

Oulton Hall Hospital, near Wakefield, and affiliated mental deficiency colonies (aggregating 780 Beds). Non-resident. If desired facilities for attendance at the Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments showing dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 5th July, 1956.

LEEDS REGIONAL HOSPITAL BOARD. Senior REGISTRAR vacancies.

Chest Diseases

Castle Hill Sanatorium, Cottingham, near Hull. (220 medical and 51 thoracic surgical beds.) Non-resident.

Child Psychiatry

Duties at Leeds University Department of Psychiatry and associated clinics.

Applications, stating age, qualifications and details of present and previous appointments showing dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 19th July, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. RESIDENT RADIOTHERAPY OFFICER (Senior House Officer status). Post vacant now and tenable in first instance for period up to 31st October. Renewable thereafter. The post affords facilities for training for D.M.R.T. Conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, and 3 names for reference, should be sent to the Secretary to the Board as soon as possible.

LICHFIELD (near). ST. MATTHEW'S HOSPITAL, BURNTWOOD, LICHFIELD. (1350 mental beds.) BURTON-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required. Resident accommodation available. Facilities for a D.P.M. course at Birmingham University will be granted.

Applications, with names of 2 referees, to Medical Superintendent.

LIVERPOOL, 8. NEWSHAM GENERAL HOSPITAL. (1300 Beds.) Applications are invited from medical practitioners for the following appointments which may be resident or non-resident and occur in September, 1956.

HOUSE PHYSICIANS in General Medicine. Pre-registration or Senior House Officer according to qualifications and experience.

HOUSE SURGEON, pre-registration.

Salaries £425–£475–£525 p.a., less £125 p.a. if resident, or for Senior House Officers £745 p.a., less £130 p.a. if resident.

Applications to the Physician-Superintendent at the Hospital as soon as possible.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL EAR, NOSE AND THROAT INFIRMARY. Applications are invited for a post of SENIOR HOUSE OFFICER in Otorhinolaryngology for the period to 30th September, 1956.

Apply as soon as possible on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

AMENDED ADVERTISEMENT

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for 3 posts of REGISTRAR in Pædiatrics for the period 1st October, 1956, to 30th September, 1957. Annual reappointment until completion of the normal period of training will be considered without need for further application. The duties of the posts will in the first instance be undertaken as follows :—

2 at the City Branch of the Royal Liverpool Children's Hospital.

1 at the Liverpool Maternity Hospital.

Apply by 11th July, 1956, stating whether interested in the post at the Maternity Hospital or the posts at the Children's Hospital, on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LOUTH, LINCOLNSHIRE. COUNTY INFIRMARY. (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Locum SENIOR HOUSE OFFICER (orthopædic and casualty), vacant 1st August, 1956, at this General Hospital.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

LOUTH COUNTY INFIRMARY. (215 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (orthopædics and casualty) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional MENTAL HOSPITAL.) Locum JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female) required for minimum period of 3 months. Previous mental hospital experience preferred. Salary £17 10s. per week, less £140 p.a. for board and residence.

Apply Medical Superintendent.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) SENIOR HOUSE OFFICER (casualty). The successful applicant will work with the Specialist Orthopædic Unit. The post is recognised for F.R.C.S.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months appointment. Post vacant 1st July, 1956. Salary at the rate of £425, £475 or £525 according to experience. A deduction at the rate of £125 a year is made for board and lodging and other services provided.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MANCHESTER (near). ALTRINCHAM GENERAL HOSPITAL AND ANNEXE (130 Beds). SENIOR HOUSE OFFICER (medical). This appointment, available early July, is in a busy hospital and offers excellent opportunities of practical experience.

Applications, together with 2 recent testimonials, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer) with duties in the Department of Orthopædic Surgery. Recognised for F.R.C.S., vacant 11th July, 1956.

Applications, with full details and names of 2 referees, by 9th July, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER. NORTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of REGISTRAR in Anæsthetics in the North Manchester Group and Booth Hall Hospital. Recognised for D.A. and F.F.A.R.C.S.

Applications, with full details and names of 2 referees, by 9th July, 1956, to Group Secretary, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology. The post is recognised for training for M.R.C.O.G. purposes. The main duties will be at Withington Hospital which takes part in undergraduate teaching. Applicants should have had previous experience in Obstetrics and Gynæcology.

Applications, stating age, experience and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of REGISTRAR in Anæsthetics vacant 1st August, 1956. The main duties will be with the Stockport and Buxton Hospital Management Committee with some duties in the Macclesfield and District Hospital Management Committee Group. The post is recognised for the D.A. and F.F.A.R.C.S., and would suit a candidate wishing to study for higher qualification.

Applications, stating age, qualifications, and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of REGISTRAR in Pathology. The duties will be with the Stockport and Buxton Hospital Management Committee and the successful candidate will work under the direction of the Consultant Group Pathologist.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) with duties in the South Manchester Group. This post is recognised by the Royal College of Surgeons for the F.F.A.R.C.S. and for the D.A.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded immediately to the Group Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER in the Department of Anæsthetics, to commence as soon as possible. Whole-time, resident appointment for 6 months, renewable for a second and possibly a third 6 months. Residence £155 p.a.

Applications, to be made on form obtainable from the undersigned, to be returned by 11th July, 1956.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of OBSTETRICAL HOUSE SURGEON to a Maternity Unit operating temporarily in the Whitworth Park Branch of the above-named Hospital, vacant 1st August, 1956. The post is supernumerary to the establishment recognised for training purposes by the Royal College of Obstetricians and Gynæcologists. Previous obstetrical experience is desirable. An opportunity exists for a limited amount of gynæcological training during tenure of the post. National scales.

Application forms, which may be obtained from the undersigned, to be returned no later than 14th July, 1956.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar grade). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER VICTORIA MEMORIAL JEWISH HOS-PITAL. (Non-Sectarian—104 Beds.) Applications are invited for the resident post of SENIOR HOUSE OFFICER in Surgery, to act as Deputy Resident Surgical Officer. Recognised for F.R.C.S.

Applications, with full details and names of 2 referees, by 9th July, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. ECCLES AND PATRICROFT HOSPITAL. (General hospital. 48 Beds.) 1 SENIOR HOUSE OFFICER required. The work of the Hospital is mainly surgical and there is a busy Outpatient Department. Post now vacant.

Forms from Secretary, Park Hospital, Davyhulme.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics) in the Obstetric Unit at Withington Hospital (over 2000 cases annually) with some pædiatric duties at other hospitals in the group.

Applications, stating age, nationality, experience, and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the Locum appointment of SENIOR HOUSE OFFICER (medical) at Withington Hospital, vacant July/August.

Applications, with full details, to be forwarded to the Group Secretary at Withington Hospital immediately.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (obstetrics and gynæcology) becoming vacant on 1st September, 1956. The Hospital takes part in undergraduate medical teaching and the post is recognised in obstetrics and gynæcology for M.R.C.O.G. purposes.

An application form should be obtained from the Group Secretary at the Hospital and returned within 14 days of the appearance of this advertisement.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, is vacant now, and carries a salary of £745 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

MORECAMBE. QUEEN VICTORIA HOSPITAL. RESI-DENT SENIOR HOUSE OFFICER (surgical). The post is normally tenable for 1 year and the successful applicant will be attached to the specialist Surgical Unit.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Whole-time ANÆSTHETIC REGISTRAR (resident), required for duties mainly at St. Albans City Hospital (384 Beds). This is a new post for increased establishment. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, by 17th July, 1956.

MAIDENHEAD HOSPITAL, Berkshire. Applications invited from registered practitioners for post of CASUALTY OFFICER, vacant now. Post recognised for F.R.C.S. Salary on House Officer scale plus £50 p.a.

Applications, stating age, qualifications and nationality, with copies of testimonials or names of 3 referees, to Secretary.

NEWCASTLE REGIONAL HOSPITAL BOARD. TEESSIDE HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR OBSTETRICIAN AND GYNÆCOLOGIST (whole-time). Single accommodation available. Post affords good obstetrical and gynæcological experience.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR REGISTRAR PSYCHIATRIST (whole-time). Appointment for 1 year only, to commence 1st October, 1956. Department under clinical direction of Professor of Psychological Medicine, University of Durham.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. ST. LUKE'S HOSPITAL, MIDDLESBROUGH. (575 Beds.) SENIOR REGISTRAR PSYCHIATRIST (whole-time), resident ; a flat is available. Candidates should normally have had previous experience in psychiatry, but applications will be considered from candidates with no previous practical experience in psychiatry who hold a higher medical qualification, have had good experience in general medicine and intend to specialise in psychiatry. Arrangements can be made for the person appointed to take the necessary course of study for the Durham D.P.M. Appointment for 1 year in the first instance and subject to annual review up to a period of 4 years. Candidates are free to visit the hospital by arrangement with the Medical Superintendent, from whom further particulars may be obtained.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NORTHAMPTON (near). CREATON SANATORIUM. Applications are invited from suitably qualified medical practitioners for the post of SENIOR HOUSE OFFICER. The Sanatorium has 138 Beds and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a new major thoracic surgical unit for tuberculous and non-tuberculous diseases of the chest.

Applications, stating age, experience, and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton.

NORTHAMPTON (near). CREATON SANATORIUM. Applications are invited for the post of HOUSE OFFICER, which is recognised as a pre-registration medical appointment. The sanatorium has 138 Beds and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a new major thoracic surgical unit for tuberculous and non-tuberculous diseases of the chest.

Applications, stating age, experience and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the following appointments vacant 1st August, 1956. All are pre-registration posts and the salaries in each case are at the rate of £425, £475, or £525 p.a., according to experience, less £125 p.a. for residential emoluments :—

(1) **Norfolk and Norwich Hospital, Norwich**

HOUSE SURGEON (1), Male or Female. Post recognised for final F.R.C.S. examination requirements. Duties entirely general surgical.

JUNIOR CASUALTY OFFICER (Male or Female), 2 Casualty Officers employed in the Department.

(2) **West Norwich and Norwich Isolation Hospitals**

HOUSE PHYSICIANS (2), Male or Female. Duties include acute medical, geriatric, and infectious diseases. The beds at these units are under the control of the Consultant Physicians at the Norfolk and Norwich Hospital, and the successful candidate will be required to undertake general medical duties under their supervision.

(3) **West Norwich Hospital, Norwich**

HOUSE SURGEONS (2), Male or Female. Post recognised for final F.R.C.S. examination requirements. Duties general surgical and including burns and plastic work. The beds at this hospital are under the control of the Consultant Staff of the Norfolk and Norwich Hospital.

(4) **Norfolk and Norwich Hospital, Norwich**

Applications are also invited for the undermentioned appointment vacant 1st August, 1956 :—

ORTHOPÆDIC HOUSE SURGEON (Male or Female), House Officer or Senior House Officer status. Salary £745 p.a. if Senior House Officer, less £150 for full residential emoluments.

Membership of a Medical Defence Society is a condition of appointment in each case.

Applications for the above posts stating age, qualifications and experience, with names of 2 referees, to be sent to Group Secretary, No. 6 Group Hospital Management Committee, St. Stephen's-road, Norwich.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE SURGEON, now vacant. Duties include surgical House charge of general surgical E.N.T. and eye cases. Post resident and available for 6 months, recognised for pre-registration.

Applications, with copies of 3 testimonials, to the Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of SENIOR HOUSE OFFICER (obstetrics 14 Beds and gynæcology 10 Beds), with opportunity for gaining experience in general surgery, vacant 14th July, 1956. Salary £745 p.a., less emoluments.

Applications, giving age, nationality and qualifications, together with copies of 3 recent testimonials, to be addressed to the Medical Superintendent.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical), which will be vacant mid-July. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration or registered HOUSE SURGEONS required. Duties to commence 1st August.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL. Senior MEDICAL HOUSE OFFICER required at the above Hospital. Resident. Duties to commence on or about 17th July, 1956. The successful candidate will, in addition to medical duties, have an opportunity of assisting in the Obstetric Unit. This post will be accepted as a general medical appointment entry to the M.R.C.O.G. examination.

Apply in writing, stating age, qualifications and experience, together with copies of testimonials, to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM (near). SAXONDALE HOSPITAL, RADCLIFFE-ON-TRENT, near NOTTINGHAM. (930 Beds. Recognised for D.P.M. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR or JUNIOR HOSPITAL MEDICAL OFFICER in Psychiatry required. House available.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

OXFORD. LITTLEMORE (MENTAL) HOSPITAL AND ASHHURST CLINIC. Applications invited for the post of SENIOR HOUSE OFFICER. Previous experience as House Surgeon or Physician essential. Previous psychiatric experience unnecessary. The Physician appointed will work primarily in the Insulin Therapy Clinic and with a Senior Consultant at Out-patient Clinics. There are ample facilities for postgraduate study in a teaching general hospital. Salary £745 p.a.

Apply Physician-Superintendent.

PAISLEY INFECTIOUS DISEASES HOSPITAL. House OFFICER required for term commencing 1st August, 1956. The post is recognised for pre-registration.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PAISLEY INFECTIOUS DISEASES HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Saint Mary's Hospital

SENIOR HOUSE OFFICER (gynæcology) required. The department consists of 50 Beds and offers excellent facilities for training. Recognised for M.R.C.O.G. Vacant now.

Queen Alexandra Hospital

SENIOR HOUSE OFFICER for Gynæcological Department (39 Beds), vacant now. Recognised for M.R.C.O.G.

Royal Portsmouth Hospital (Orthopædic Department—104 Beds)

HOUSE OFFICER (pre-registration), vacant now.

Royal Portsmouth Hospital

HOUSE OFFICER for pædiatric and medical beds (30 Beds). Pre-registration post, vacant 16th July.

Queen Alexandra Hospital (78 medical beds)

HOUSE PHYSICIAN (pre-registration), vacant 30th July.

Saint Mary's Hospital (74 medical beds)

HOUSE PHYSICIANS (pre-registration), vacant 30th July (1), and 31st July (2).

Saint Mary's Hospital (130 surgical beds)

HOUSE SURGEONS (pre-registration). Posts vacant 23rd, 29th and 30th July.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. AREA PATHOLOGICAL DEPARTMENT. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology, vacant 1st July, 1956. The appointment will be for a period of 12 months, in the Area Laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. ALEXANDRA MATERNITY HOME, DEVONPORT, and FLETE MATERNITY HOME, ERMINGTON. HOUSE OFFICER in Obstetrics, vacant 10th September, 1956.

Applications, stating age, nationality, qualifications and experience with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. CENTRAL CASUALTY DEPARTMENT. SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICERS in Anæsthetics, vacancies 1st September, 1st October, 1956. Recognised for the D.A. and F.F.A.R.C.S. The appointments will be for a period of 12 months. South Devon and East Cornwall Hospital, Plymouth.

HOUSE SURGEONS (pre-registration posts), vacancies June and 1st July, 1956. Recognised for the F.R.C.S. Greenbank Road Section.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PONTYPRIDD AND RHONDDA HOSPITAL MANAGE-MENT COMMITTEE.

East Glamorgan Hospital, Church Village, near Pontypridd (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for M.R.C.O.G., D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A.R.C.S., D.A.)

SENIOR HOUSE OFFICER (surgical), to commence 24th July, 1956.

SENIOR HOUSE OFFICER (anæsthetics), to commence 29th August, 1956.

SENIOR HOUSE OFFICERS (medical), to commence 1st August, 1956, to include duties at Llwynypia Hospital.

SENIOR HOUSE OFFICER (pædiatrics), to commence 1st August, 1956.

2 HOUSE OFFICERS (medical), to commence 1st August, 1956.

HOUSE OFFICER (pædiatrics), to commence 1st August, 1956.

4 HOUSE OFFICERS (surgical), to commence 1st August 1956, to include duties at Porth and District Hospital.

2 HOUSE OFFICERS (obstetrics), to commence 1st August, 1956.

Llwynypia Hospital, Llwynypia, Rhondda (50 acute medical beds; geriatric beds; serving area population of 112,000)

SENIOR HOUSE OFFICER (medical), to commence 1st August, 1956.

Person appointed will have part responsibility for the Group Infectious Diseases Hospital.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

PONTEFRACT. HEADLANDS HOSPITAL. House PHYSICIAN (Senior House Officer grade) required to fill a resident post at above Hospital. This is a modern Geriatric Unit of 215 Beds.

Applications as soon as possible, to—

D. G. DAVIES, Secretary, Pontefract and
Castleford Hospital Management Committee.
Great Northern House, Salter-row, Pontefract.

READING AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. SENIOR HOUSE OFFICER for E.N.T. Department, Royal Berkshire Hospital, Reading (40 Beds). Post recognised for D.L.O.

Applications, stating age, nationality, experience and qualifications, together with names of 2 referees, should be sent to Group Secretary, 3, Craven-road, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for post of RESIDENT JUNIOR HOUSE SURGEON in the Area Accident and Orthopædic Department, vacant 1st August, 1956. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £125 board-residence.

Apply, stating age, qualifications with dates, nationality, present post with 1 copy of recent testimonial, to Hospital Secretary.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners, Male and Female, for resident appointment of GYNÆCOLOGICAL HOUSE SURGEON at the Royal Berkshire Hospital, vacant immediately and tenable for 6 months. Post recognised for M.R.C.O.G.

Write, stating age and qualifications with dates, nationality, and present appointment, with a copy of 1 recent testimonial, to the Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the appointment of a SENIOR HOUSE OFFICER (anæsthetics), vacant 1st August next for a period of 1 year. Post recognised for F.F.A.R.C.S. Salary £745 p.a., less £125 for board-residence.

Write, stating age, qualifications with dates, nationality and present post together with the names of 2 referees, to the Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

RHYL. ROYAL ALEXANDRA HOSPITAL. Applications are invited for appointment, as from 1st August, 1956, of SENIOR HOUSE OFFICER (surgery) at the above Hospital.

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl, within 10 days from the date of publication of this advertisement.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited for appointment of HOUSE PHYSICIAN at the above Hospital. Vacant 1st August, 1956.

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, to be sent immediately to the Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE OFFICER (surgery), post available at Birch Hill Hospital mid-July. Recognised 6 months F.R.C.S. experience. Pre-registration candidates eligible.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROTHERHAM HOSPITAL, Doncaster Gate, Rotherham. (161 Beds. Recognised for training for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics and casualty) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

RAMSGATE. GENERAL HOSPITAL. (101 Beds.) House SURGEON. Approved pre-registration post. Salary at the rate of £425–£525 p.a., according to experience, less £125 for resident emoluments.

Applications, with copies of testimonials, to Hospital Secretary.

SALISBURY GENERAL HOSPITAL. (Orthopædic DEPARTMENT.) Applications are invited for the post of SENIOR HOUSE OFFICER (resident) or RESIDENT HOUSE SURGEON, which is also recognised for pre-registration candidates and becomes vacant on 1st August, 1956. The department has over 50 Beds and a large outpatient turnover, dealing with fractures and all types of orthopædic surgery.

Applications, stating age, nationality, qualifications and experience, and naming 2 referees, to the Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND EASTERN REGIONAL HOSPITAL BOARD. Pædiatrics. DUNDEE GENERAL HOSPITALS. Applications are invited for the post of REGISTRAR in Pædiatrics in the Professorial Units at Dundee Royal Infirmary (510 Beds) and Maryfield Hospital, Dundee (360 Beds), the main teaching hospitals associated with the University of St. Andrews. The duties will include teaching of undergraduates. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Bracknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 14th July, 1956.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. General Medicine. STRACATHRO HOSPITAL, BRECHIN. Applications are invited for the post of REGISTRAR in Medicine at Stracathro Hospital, Brechin (a general hospital of 675 Beds—150 medical). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Bracknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 14th July, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance:—

REGISTRAR in General Surgery and Gynæcology based at the Royal Infirmary, Greenock.

REGISTRAR in Surgery based at Stobhill General Hospital, Glasgow, with duties primarily at Falkirk and District Royal Infirmary.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 14th July, 1956.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the post of NON-RESIDENT REGISTRAR or SENIOR HOUSE OFFICER in Clinical Pathology. Grade according to qualifications and experience.

Applications, with the names of 3 referees, to be sent at once to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Obstetrics and Gynæcology (transitional appointment) required at City General Hospital, Sheffield, for 1 year in first instance. There are 106 obstetric and 42 gynæcological beds including a Professorial Unit at this Hospital. Applications from Senior Registrars in Obstetrics and Gynæcology in their fourth or subsequent years and from those who held such posts for 3 years or more but vacated them after 1st January, 1951.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 16th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Sheffield NATIONAL CENTRE FOR RADIOTHERAPY. Whole-time NON-RESIDENT SENIOR REGISTRAR required. Candidates should possess the Diploma in Radiotherapy or a higher qualification in Medicine or Surgery. Duties mainly in Sheffield but there may be occasional duties at associated Centres in the Region. Appointment for 1 year in first instance, reviewable annually.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 9th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR REGISTRAR in Children's Psychiatry required. The post, intended to give experience with a view to specialising in children's psychiatry, is attached to the Mapperley Hospital, Nottingham, but is integrated with the child-guidance clinics of the Nottingham City and County Councils. D.P.M. essential. Appointment for 1 year in first instance, reviewable annually.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 16th July, 1956.

SHEFFIELD. CITY GENERAL HOSPITAL. (652 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT MEDICAL REGISTRAR required with duties also at Fir Vale Infirmary. General medical experience would be gained at the City General Hospital and geriatric experience at Fir Vale Infirmary. Post vacant 1st August. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 13th July, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLAND HOSPITAL. (411 Beds.) CASUALTY OFFICER (Senior House Officer grade). New post, vacant now; recognised for F.R.C.S.

Application forms to be obtained from and returned to Surgeon-Superintendent, Southlands Hospital.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CO. DURHAM. (557 Beds.) Applications are invited for the resident posts of 2 HOUSE PHYSICIANS which are recognised for pre-registration purposes. Salary £425–£525 p.a. according to experience. Deduction of £125 p.a. for board, lodging, &c. 6 months appointment.

Applications, stating age, qualifications, experience and enclosing copies of 2 recent testimonials, to the Group Secretary, North West Durham Hospital Management Committee.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CONSETT, CO. DURHAM. RESIDENT HOUSE OFFICER required for 6 months for duties in Obstetrical (30 Beds) and Gynæcological (43 Beds) Departments. Resident at Richard Murray Maternity Hospital. Recognised for D.Obst.R.C.O.G. Second pre-registration or post-registration appointment.

Apply to the Group Secretary, North West Durham Hospital Management Committee, stating age and experience, and enclosing copies of 3 recent testimonials.

SHOTLEY BRIDGE GENERAL HOSPITAL, Shotley BRIDGE, CO. DURHAM. (557 Beds.) Applications are invited for the resident posts of 2 HOUSE SURGEONS which are recognised for pre-registration purposes. Salary £425–£525 p.a., according to experience. Deduction of £125 p.a. for board, lodging, &c. 6 months appointment. Posts recognised for F.R.C.S.

Applications, stating age, qualifications, experience, and enclosing copies of 2 recent testimonials, to the Group Secretary, North West Durham Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY/ORTHOPÆDIC/ACCIDENT HOUSE SURGEON (Senior House Officer). Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry, for postgraduate study, with the Consultant. Post recognised under revised Fellowship regulations in respect of 6 months training required for the Final Fellowship examination. Vacant 24th July, 1956.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEONS (2), vacant 12th July, 1956. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants. Post tenable from 1st September, 1956.

Applications to Medical Superintendent.

SUTTON. BELMONT HOSPITAL. St. Ebba's and BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment as SENIOR REGISTRAR at above Hospital, which is principally concerned with the treatment of neuroses and the early psychoses. There are ample opportunities for research and the Hospital takes an active part in teaching in association with teaching hospitals. The vacancy is in the Social Rehabilitation Unit which is concerned primarily with the treatment of psychopaths on group lines. Candidates should possess the D.P.M. and may visit the Hospital by appointment with the Physician-Superintendent.

Application forms may be obtained from the Group Secretary, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time RESIDENT REGISTRAR in Obstetrics and Gynæcology for the West Dorset Group of hospitals for approximately 2 months from the end of June. The main duties will be in Weymouth and Dorchester. Appointment will be in accordance with the terms and conditions of service of hospital medical staff.

Applications, stating age, qualifications, and experience, and the names and addresses of 3 referees, to the Area Secretary, "Highcroft," Romsey-road, Winchester, by 9th July.

SOUTHPORT GENERAL INFIRMARY. (Recognised for F.R.C.S. and pre-registration.) HOUSE SURGEON (general surgery and ophthalmology). Post vacant July.

Apply, stating age, nationality, qualifications, experience and names of 2 referees, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHPORT GENERAL INFIRMARY. Junior Hospital MEDICAL OFFICER (resident). Whole-time casualty post, vacant early August.

Apply, stating age, nationality, qualifications, experience and copies of 2 recent testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SIDCUP AND SWANLEY HOSPITAL MANAGEMENT COMMITTEE. 2 SENIOR HOUSE OFFICERS (casualty and orthopædic) required immediately. Each officer will be required to serve 3 months as Casualty Officer and 3 months in the Orthopædic Department. The post is recognised under the Fellowship regulations as a period of 6 months casualty training. Hospital is situated in pleasant surroundings within easy reach of London.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be sent to Secretary, Queen Mary's Hospital, Sidcup, Kent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum MEDICAL REGISTRAR required 15th–21st July.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.) HOUSE OFFICER required. Total establishment of 3 residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to be submitted by 14th July to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required immediately. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Applications invited for HOUSE OFFICER (medical), vacant 18th July. Recognised pre-registration post.

Detailed applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery), vacant now. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. BUCKNALL HOSPITAL. (58 infectious, 124 chronic sick beds.) Applications invited for post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER. Married accommodation available if required.

Applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (E.N.T.) required, vacant now. Recognised F.R.C.S. and D.L.O.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine) with dermatology. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. RESIDENT SENIOR HOUSE OFFICER (Casualty Officer), vacant 7th September. Post recognised for F.R.C.S.

Applications, stating age, experience, and qualifications, with copies of recent testimonials and the names of 2 referees, to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

TREDEGAR GENERAL HOSPITAL (20 miles from Newport, Mon., and 24 from Teaching Hospital at Cardiff; 6 miles from the Vale of Usk). HOUSE SURGEON required at above Hospital. Surgical unit of 50 Beds with also 6 orthopædic beds under daily supervision of Consultant Surgeons and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty and Radiology Departments. Married quarters available. Pre-registration if suitable candidate available.

Apply, with full particulars, to Group Secretary, Rhymney and Sirhowy Valleys Hospital Management Committee, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glam., by 11th July.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required as soon as possible. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, and age together with copy testimonials (quoting reference F.955/70), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TORQUAY. TORBAY HOSPITAL. (166 Beds.) Senior RESIDENT HOUSE OFFICER (anæsthetics) required as soon as possible. There is a complement of 6 Resident House Officers and the Hospital is recognised for the D.A. and for the F.F.A.R.C.S.

Applications, stating qualifications, age, nationality, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TUNBRIDGE WELLS. KENT AND SUSSEX HOSPITAL. (301 Beds.) TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SENIOR HOUSE OFFICER (casualty), Male or Female. Recognised F.R.C.S., vacant 6th August, 1956.

Apply, giving age, qualifications, experience with names of 2 referees, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. SENIOR HOUSE OFFICER required for Orthopædic Department. Salary £745 p.a. Residential accommodation at charge of £155 p.a.

Written applications, giving full details of experience, &c., and 2 names and addresses for reference, to—

W. BOWRING, Group Secretary.

Victoria Chambers, Wood-street, Wakefield.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the vacant post of RESIDENT ANÆSTHETIST (Male or Female). Graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT CASUALTY OFFICER (Male or Female), now vacant. The post is graded Junior Hospital Medical Officer. Scale of salary £775–£50–£1075, less a deduction of £130 for residential emoluments. Applications will also be considered from Junior Medical Officers who would be graded House Officer or Senior House Officer at the scale appropriate to the experience of the applicant. Consideration will also be given to applicants who desire the appointment on a short-term basis. A whole-time Senior Hospital Medical Officer is in charge of the Department.

Applications, stating age, experience and qualifications should be forwarded or telephoned to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.
(Tel. No. Warrington 1666.)

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) ORTHOPÆDIC HOUSE SURGEON (with certain casualty duties) required. Post recognised for F.R.C.S. (Eng.) examination. Intermediate or senior post depending on experience, for Orthopædic Unit (30 Beds). The Orthopædic Service is in the charge of a Consultant and Registrar closely associated with a Postgraduate Teaching Hospital.

Applications, with copies of 2 testimonials, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WESTCLIFF HOSPITAL, Balmoral-road, Westcliff-on-SEA, ESSEX. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade). Post now vacant. The Hospital deals with communicable diseases and general medicine. The appointment covers a wide field of medicine and offers excellent training for general practice.

Applications should be sent to the Secretary, General Hospital, Prittlewell-chase, Southend-on-Sea, Essex, as soon as possible.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident), vacant 1st August, 1956, of HOUSE SURGEON.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds. Pre-registration post, recognised F.R.C.S. (Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post), vacant now.

Detailed applications, with dates and names of 2 referees, to Secretary, Workington Infirmary, Cumberland.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of PÆDIATRIC HOUSE PHYSICIAN at the above Hospital, to commence 1st August, 1956. The appointment is recognised for the D.C.H. and for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st August, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st August, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of HOUSE PHYSICIAN at the above Hospital, to commence 1st August, 1956. The appointment is recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM (near). TREVALYN MANOR MATERNITY HOSPITAL, ROSSETT, near WREXHAM. (47 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital to commence 1st August, 1956. The Hospital is recognised by Central Midwives Board as a Part II Midwifery Training School and deals with normal and abnormal midwifery.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COM-MITTEE. SENIOR HOUSE OFFICER in General Surgery required for duty at Billinge Hospital, Orrell, near Wigan (370 Beds). Post vacant 1st July.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COM-MITTEE.

Royal Albert Edward Infirmary, Wigan

3 HOUSE SURGEONS (pre-registration posts). First vacant 17th July (casualty duties). Second and third vacant 17th and 31st July (general duties).

Leigh Infirmary

HOUSE SURGEON (pre-registration post), vacant 29th July.

Applications, with names of 2 referees, to the Secretary, Knowsley House, Wigan.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

SENIOR HOUSE OFFICER (Anæsthetist), vacant now. Appointment recognised for D.A. and F.F.A.R.C.S.

Apply Secretary, with copies of testimonials.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of REGISTRAR in the Department of Anæsthetics at the above-named Teaching Hospital which is in special relationship with the University of London. Higher qualifications desirable but not essential. The successful candidate will be required to commence duties by mid-September, 1956. The appointment will be for 1 year in the first instance, subject to renewal. Salary is payable within the scale £900–£100–£1100 : £1200–£100–£1500 p.a., depending on experience and qualifications. Single accommodation and board are provided at a deduction of £145 p.a., or, if available, unfurnished accommodation at 5% of salary. Return first-class passage by sea will be paid for 1 person only.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital, Mona P.O., Jamaica, B.W.I., to whom applications, stating age, nationality and details of qualifications and experience, together with 3 recent testimonials or names and addresses of 3 referees, should be sent by 28th July, 1956.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of REGISTRAR in the Division of Medicine at the above-named Teaching Hospital which is in special relationship with the University of London. Higher qualifications desirable but not essential. The successful candidate will be required to commence duties by mid-October, 1956. The appointment will be for 1 year in the first instance, subject to renewal. Salary is payable within the scale £900–£100–£1100 : £1200–£100–£1500 p.a., depending on experience and qualifications. Single accommodation and board are provided at a deduction of £145 p.a., or, if available, unfurnished accommodation at 5% of salary. Return first-class passage by sea will be paid for 1 person only.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital, Mona P.O., Jamaica, B.W.I., to whom applications, stating age, nationality and details of qualifications and experience, together with 3 recent testimonials or the names and addresses of 3 referees, should be sent by 28th July, 1956.

SOUTH AFRICA. DONALD FRASER HOSPITAL. SIBASA, NORTHERN TRANSVAAL. Applications are invited for the post of ASSISTANT MEDICAL OFFICER in the above Mission Hospital. Applicants must be interested in the physical and spiritual welfare of the African Staff and patients. Salary scale £825–£75–£900–£100–£1000–£50–£1250, plus £200 cost-of-living allowance. Previous experience will be taken into consideration in determining commencing salary. The Hospital has 180 Beds and is planning to add another 100 Beds for patients suffering from tuberculosis. There are 2 well-equipped operating theatres and an X-ray plant.

Applications, giving details of age, experience, and qualifications, together with the names and addresses of 2 referees, should be addressed to the Medical Superintendent, Donald Fraser Hospital, P.O. Vhufuli, Via Sibasa, Northern Transvaal, South Africa.

WELSH REGIONAL HOSPITAL BOARD.

PÆDIATRIC REGISTRAR, Maelor General Hospital, Wrexham (591 Beds). Unit consists of 50 general pædiatric beds, also care of neonates. Recognised for D.C.H. Resident. Post vacant early August, 1956.

REGISTRAR in Thoracic Surgery. Based at Morriston Hospital, Morriston, near Swansea, also expected serve other hospitals in district. Unit has 60 Beds for all types thoracic surgery, including tuberculous, non-tuberculous, œsophageal and cardiac. Resident/non-resident.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

Public Appointments

NORTHERN NIGERIA. For appointment of Medical Officers see page 36.

GOVERNMENT OF BRITISH GUIANA. Pathologist required for the New Amsterdam Hospital and the Mental Hospitals, to have charge of laboratory staff, buildings and equipment; to supervise laboratories of government hospitals and be responsible for training of laboratory technicians. Candidates must hold medical qualifications registrable in the United Kingdom and Diploma in Pathology or Bacteriology. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service; or on contract for 3 years resident service with gratuity taxable of 22½% of salary for each 3 months service. Candidates in the National Health Service may leave but retain their superannuation rights during their service abroad (up to 6 years) and receive a gratuity (taxable) of 20% of the aggregate of their salary on leaving overseas employment. Salary £1600 a year plus non-pensionable allowance of £250 a year in lieu of consultation fees. Private practice not permitted. Free unfurnished quarters or an allowance of £100 a year in lieu. Generous home leave. Free passages on appointment for Officer, wife, and children under 18 years, not exceeding 5 persons in all. Assisted passages for officer and wife on leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (reference BCD. 117/30/019).

HER MAJESTY'S OVERSEA SERVICE. Swaziland GOVERNMENT. MALARIA MEDICAL OFFICER required. Applicants should have medical qualifications registrable in the United Kingdom, possess a sound knowledge of the protozoology and entomology connected with malaria, and have some experience in modern malaria control methods. Some experience in clinical pathology would be an advantage: there is a small public health laboratory under the Malaria Medical Officers control. Appointment on 2 years probation for permanent and pensionable employment. Salary scale ranges from £940 to £1515 a year, entry point dependent on experience. Cost-of-living allowance from £113–£132 a year for married men and half that amount for single men. Education allowance of £50 for each child, up to a maximum of £150 a year. Candidates in the National Health Service may leave but retain their superannuation rights during their time in the Oversea Service (up to 6 years) and receive a resettlement grant of 20% of the aggregate of their oversea salary on leaving the Oversea Service at the end of their engagement. Doctors appointed from the National Health Service may be considered for permanent terms at any time. Quarters provided at rental of 10% of salary. Local leave is permissible and generous home leave is granted after each tour of 3 to 4 years. Free passages provided for officer and wife, and assisted passages for children.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/76/05).

DURHAM COUNTY COUNCIL. Health Department. ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICER. Applications are invited from registered medical practitioners (Female). Commencing salary £975 p.a., rising by annual increments of £50 to £1375 p.a.

The appointment is subject to certain conditions, particulars of which may be obtained from the County Medical Officer of Health, Shire Hall, Durham, to whom applications, together with the names of not more than 3 referees, should be sent not later than 16th July, 1956.

J. K. HOPE, Clerk of the County Council.

WALSALL. COUNTY BOROUGH OF WALSALL. Applications are invited from registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH at a salary of £975 p.a., rising by annual increments of £50 to £1375 p.a. (Salary scales under review.) The commencing salary will be decided according to qualifications and experience. Possession of the D.P.H. or D.C.H. will be considered an advantage.

Further particulars and application forms may be obtained from W. STALEY BROOKES, Town Clerk.

Council House, Walsall.

CANCER CLINIC ASSOCIATE

(No. 4192)

ALLAN BALIR MEMORIAL CLINIC

REGINA, SASK.

Salary: $535 per month with automatic annual increases to $635 per month.

Requirements: Graduation from a recognised medical school preferably supplemented by special courses in surgery, pathology and general medicine and at least 2 years postgraduate work experience in clinical medicine associated with the diagnosis and treatment of cancer.

For application forms and details write to Personnel Officer, Department of Public Health, Provincial Health Building or Public Service Commission, Legislative Building, Regina, Sask., Canada.

SURREY COUNTY, REIGATE BOROUGH AND GODSTONE RURAL DISTRICT COUNCILS. DEPUTY COUNTY DIVISIONAL AND ASSISTANT MEDICAL OFFICER AND BOROUGH AND RURAL DISTRICT DEPUTY MEDICAL OFFICER OF HEALTH.

Applications for this mixed appointment within salary scale £1250 18s. 3d.–£58 8s. 2d. (4)—£48 8s. 2d. (4)—£1678 3s. 7d., giving fullest details of qualifications, experience, &c., and names of 3 referees, must reach the Clerk of the Council, County Hall, Kingston upon Thames, by 9th July, 1956.

SWINDON. BOROUGH OF SWINDON. Applications are invited from duly qualified medical practitioners for the appointment of ASSISTANT to the Medical Officer of Health and Principal Borough School Medical Officer, who is also Area Medical Officer under the Wiltshire County Council. The present salary is at the rate of £1050 p.a., rising by annual increments of £50 to £1200 and then by annual increments of £55 to £1475 p.a.

Applications, together with the names of 3 persons to whom reference may be made, must be submitted to the Town Clerk, Civic Offices, Swindon, by 14th July, 1956. Further particulars will be supplied on request.

WARWICKSHIRE COUNTY COUNCIL. County Medical OFFICER OF HEALTH'S DEPARTMENT. Applications are invited from registered medical practitioners for the permanent appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH (Male or Female). Preference will be given to those holding the D.P.H. or D.C.H. and with previous experience. Conditions of service and salary (£1050–£1475) will be in accordance with the Whitley Council. The candidate will be required to provide a motor-car in the performance of duties, for which Whitley Council scale allowances are payable.

Further particulars (including details of area and duties) and application forms may be obtained from the County Medical Officer of Health, Shire Hall, Warwick. Closing date for applications is 14th July, 1956.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick.

Hospital Services: Non-Medical Appointments

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE GENERAL HOSPITAL, Steelhouse-lane, BIRMINGHAM, 4. Applications are invited from experienced Technicians for a post now vacant in the Department of Biochemistry. Grading will be according to qualifications and experience.

Applications, with references, should be made to the House Governor, within 3 weeks of the appearance of this notice.

LLANDOUGH HOSPITAL, Penarth, Glamorgan. Applications are invited for the post of HOSPITAL BIOCHEMIST (senior grade) at above Hospital. This is one of the 2 main teaching hospitals of the United Cardiff Hospitals. Salary (£910–£1230) according to Whitley Council P.T.A. Circular no. 34.

Detailed applications, including the names of 2 referees, should be sent to the House Governor, Cardiff Royal Infirmary, Cardiff, within 14 days of the appearance of this advertisement.

Miscellaneous

Mobil Oil Company Limited invites applications for the whole-time post of Company Medical Adviser. Applicants should not be more than 40 years of age. A senior qualification and substantial experience in medicine are desirable. The Adviser will be required to live in London, establish a Medical Department at the Company Headquarters, and coördinate the work of the Medical Officers at Company plants throughout the country. Membership of the Company's Superannuation and Life Assurance Scheme is obligatory; there are additional benefit schemes and services. Salary according to qualification but initially not less than £2000 p.a. with increments based on merit.

Application forms may be obtained from the Manager, Employee Relations Department, Mobil Oil Company Ltd., Caxton House, Tothill-street, S.W.1 (reference MA.154).

Assistantship with view to partnership offered in rural practice in Scotland. Cottage hospital appointment. Sound experience of general surgery, Registrar or higher standard, essential. Some experience of midwifery a recommendation. House available shortly. Salary £1250–£1400 according to experience. Partnership on completion of not more than 12 months probation.

Applications before 21st July, with detailed record of experience and names of 3 referees, to Box 5694, ROBERTSON & SCOTT, 42, Charlotte-square, Edinburgh, 2.

Experienced Medical Secretary required by 2 Consultants, London, W.1. Permanent appointment commencing July. Any existing holiday arrangements honoured.—Telephone: LANgham 3883.

Swiss Alps. Home school for children 4-12. Madam Bela takes 25 children with her own 5 for school subjects. Excellent food and care of health. Ideal for delicate children. Children welcomed for full school year or shorter periods.—Apply for details to "LA BELLE MAISON", Caux-sur-Montreux.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, June 30, 1956.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

for the harassed patient

Smoothly and unobtrusively 'Drinamyl Spansule' gives the harassed housewife, the overworked business man or the menopausal woman day-long relief from tension—with just one oral dose. 'Drinamyl Spansule' does not tempt the patient to establish the melancholy t.i.d. or q.d. habit of taking 'another pill to keep me going'. * Harassment and worry are replaced by an unfluctuating mood of untroubled composure.

'Drinamyl Spansule' sustained release capsules *Strength No. 1:* each capsule contains 10 mg. 'Dexedrine' (dextro-amphetamine sulphate) and 64 mg. (gr. 1) amylobarbitone. *Strength No. 2:* each capsule contains 15 mg. 'Dexedrine' (dextro-amphetamine sulphate) and 97 mg. (gr. 1½) amylobarbitone.

Both strengths in containers of 30 capsules

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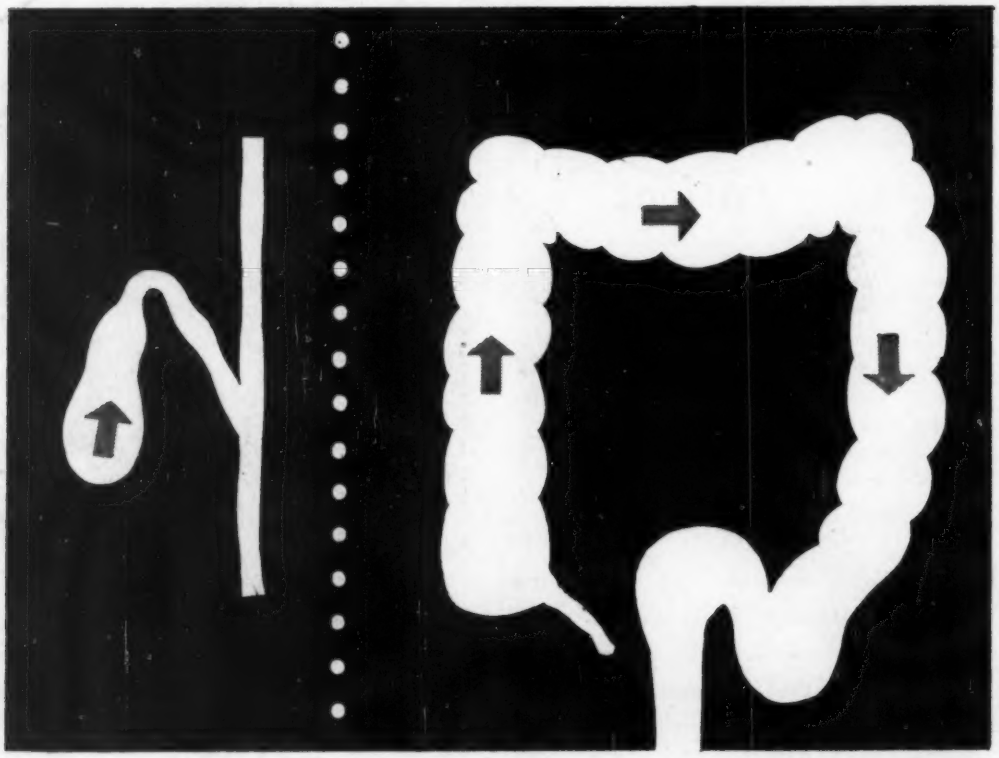

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